IEEE CENTER FOR THE HISTORY OF ELECTRICAL ENGINEERING

Newsletter Number 6 Summer 1984

Four Years—and Change

Eric Herz, IEEE Executive Director and General Manager, and Robert Friedel setting up "Lines & Waves"

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.

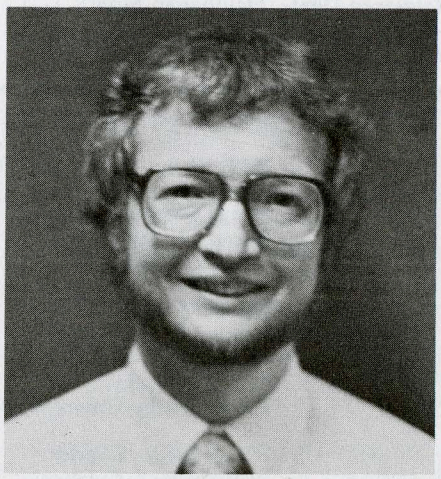
Much of the work of the Center and its value to engineers, historians, and the public lies outside clearly defined projects and programs, but is instead to be found in the now routine provision of assistance, advice, and information. The Center has established itself as a key resource for researchers 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 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.

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 Andre Millard, Bentley College. All aspects of life at the lab—personal, physical plant, research, and organizational—are to be covered in this first intensive study. The project, scheduled for completion in June 1986, 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 1955 and measures 1,000 linear feet, includes the records of 1,043 companies that merged over a period of 85 years to form today's Pennsylvania Power & Light Company. It documents the development of the electric 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 culminated in the formation of a great regional power network.

Researchers interested in using the collection should contact the Research & Reference Dept., Eleutherian Mills Historical Library, P.O. Box 3630, Wilmington, DE, 19807 (302-658-2400).

Association pour l'histoire de l'eléctricité en France

The study of the history of electrical science and technology is promoted in France by the *Association pour l'histoire de l'electricite en France*. The *Association's* mission is the study and dissemination of the history of electricity in France, especially since 1880.

This mission is to be carried out through a variety of programs, including the assembling of historical materials related to the history of electricity; coordinating the efforts of institutions, groups, and individuals; and promoting new research efforts. It is hoped to spread the results of this work through the publication of original sources, new studies, and reviews, the organization of conferences, and the production of a general work on "the history of electricity in France since 1880."

It is also the goal of the organization to assist in the identification and preservation of the most important archival materials, historical artifacts, and historic sites. The *Association* publishes its work in the *Bulletin d'histoire de l'electricite*, and is supported by a Council that includes prominent figures from the electric industry, the government, and the academic historical community.

Inquiries should be directed to Association pour l'histoire de l'electricite en France, 47 rue de Monceau, 75008 Paris, France.

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 of papers by laser pioneers and a historical exhibit.

IEEE History Fellowship

Applications for the 1985-86 IEEE Fellowship in Electrical Engineering History are now open. For the past five years, the Fellowship has supported one year of full-time research for a doctoral dissertation, in the form of a stipend of $8,500 with an additional allocation of up to $2,000 to pay academic tuition and fees. This support will continue, but the 1985-86 Fellowship will also be open to post-doctoral applicants for the first time. In the case of the Fellowship being awarded to a post-doctoral candidate, the Fellow will receive up to one year of support, in the form of a stipend of $10,500. Post-doctoral Fellows, unlike pre-doctoral recipients, will also be eligible to receive additional support from other sources.

The closing date for applications for the 1985-86 Fellowship is 1 February 1985. Forms and further information are available from the Center for the History of Electrical Engineering.

The 1984-85 IEEE Fellowship in Electrical Engineering History has been awarded to Andrew Butrica, a Ph.D. candidate in the Program in History of Technology and Science at Iowa State University.

Mr. Butrica is working on a dissertation entitled "Hermes Unbound: The Telegraphic Origins of Electrical Engineering in France, 1837-1881." It is a study of electrical engineering in France from the invention of the electrical telegraph in 1837 to 1881, when the first International Electrical Exposition and Congress took place in Paris, marking the rise of power engineering. The dissertation will focus on the relationship between science and technology in French telegraph engineering by examining the two groups directly involved in telegraphy, namely the engineers employed by the state telegraph service and the manufacturers of telegraph apparatus. This inquiry surveys the training of telegraph engineers and telegraph instrument manufacturers, the institutions for the organization and diffusion of scientific and technological knowledge, the role of journals and institutions in uniting science with practice, and telegraphic science and technology, in each case seeking to identify or refute a link between science and technology.

Centennial Histories

The IEEE Centennial has provided the inspiration for many entities of the IEEE to do some digging into their own origins. The Center is pleased to accept copies of these historical efforts, as well as provide as much assistance as possible in their preparation.

"Radioana"— The George H. Clark Collection

The Smithsonian Institution's Clark Collection is one of the world's richest resources for the history of radio. The following article is one in a continuing series, all with the aim of making the most important collections in electrical history better known to potential users.

Clark Collection, Smithsonian Institution

George H. Clark at the Stone Telegraph & Telephone Co., 1904

J. E. Bedi

> *In 1888, when I was a lad of seven, I suddenly blossomed out as a scrapbook addict, and for years I gave up boyhood games for the pleasure of sitting in a lonely attic and 'pasting up' my books.*

George H. Clark's hobby as a "lad of seven" grew into a lifelong passion. In his teens, his collecting took on a specific focus when he became "infatuated with things electrical." In fact, during high school and college, Clark worked as a telegraph operator for the Boston and Maine Railroad. Then, as an undergraduate at the Massachusetts Institute of Technology, Clark's interest made 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 Stone, 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's firm, the Stone Telegraph and Telephone Company, in Boston.

Five years later, Clark entered the civilian service of the 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 Trogner, 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 calling "Radioana." When he had this material organized, he had the numbered, pasted up pages bound—they totaled 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 Weagant, who was developing circuits to reduce the interference 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 (now RCA) newly-created Show Division.

The Show Division was responsible for exhibits of both historical and contemporary radio apparatus at such venues as trade shows, state 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 around 1933, however, the grand plan for a National Radio Museum, as a cooperative effort between RCA and the Smithsonian, seems to have gone with it. The collected objects were eventually given to the new Museum of Science and Industry in Chicago and the Henry Ford Museum in Dearborn, Michigan, when the Smithsonian was unable to provide space for the artifacts. Clark retained and continued organizing and adding to his pasted up "Radioana" collection, however, which was becoming a valuable resource to RCA, especially in patent litigation.

Both "Radioana's" 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, "Radioana" 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, now 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 overriding collecting passion of one individual." "Radioana" 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 special 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 own autobiography, Clark also wrote biographies of John Stone Stone and Roy Weagant. "Radioana" is a pictorial treasure trove 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 accounts for business records, laboratory

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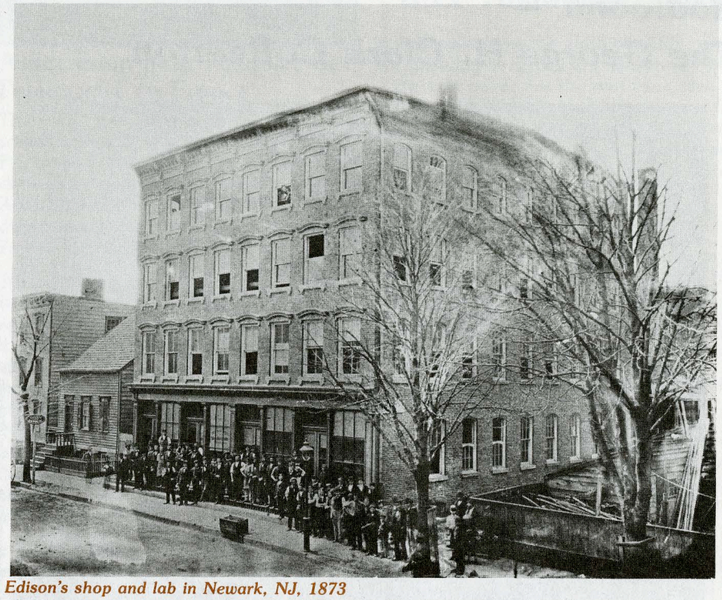
notes, correspondence, reminiscences, photographs, and other materials from Reginald Fessenden's National Electric Signaling Company, radio industry lawyer Philip Farnsworth, and Alfred Goldsmith, among others.

All of this material was arranged by Clark, based on the Navy filing system which he helped devise in 1915. He divided the material into 259 numbered "classes" or series, and assigned class numbers to types of equipment, systems, scientific theories, and more general topics such as "company history" and "biography." Each item within a class was given a unique number as well, and cross references were made between series. Clearly, Clark's was an exceptionally organized passion.

At this time, the collection has not been completely processed physically or intellectually. The Archives Center is producing a preliminary finding aid, which will be available in the Fall, to provide researchers with a first level of access and the Archives Center with an initial level of control. Further processing of the collection will continue "as resources permit." However, with the guidance of the Archives Center staff and of Clark himself, through his detailed classification system, the persevering researcher will be rewarded.

For further information on using the Clark Collection, contact the Archives Center, National Museum of American History, Smithsonian Institution, Washington, DC, 20560 (202-357-3270).



Edison National Historic Site

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 Market St., Frederick, MD, 21701 (301-694-0100).

MEETINGS

Society for the History of Technology

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 Science, Technology and Society. As is customary, SHOT's special interest group in the history of electrical technology, the Jovians, will hold its annual gathering during the meeting. Registration materials will be mailed to SHOT members by 1 September; others may request this information from Gayle Fitzgerald, 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 should contact Lindy Biggs, 48 Edgecliff Rd., Watertown, MA, 02172 (617-923-4550).

History of Science Society

The annual meeting of the History of Science Society will be held at the Palmer House, Chicago, on 27-30 December. This will be a joint meeting with the American Historical Association, marking both the 60th anniversary of the History of Science Society and the 100th anniversary of the American Historical Association. Of particular interest to *Newsletter* readers will be the session jointly sponsored by the AHA and the Society for the History of Technology entitled, "The State and Technological Change: Large Scale Electrical Systems in the Twentieth Century" (W. Bernard Carlson, Michigan Technological University, chair).

For registration materials and further information, contact the History of Science Society, 215 South 34th Street/D6, University of Pennsylvania, Philadelphia, PA, 19104.

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 materials 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.

NEW PUBLICATIONS

The Newsletter's *"Publications" section was prepared by Ronald R. Kline of the University of Wisconsin-Madison, with assistance from Thomas Higgins and John Neu, also of the University of Wisconsin.*

Books

A Century of Honors. New York: IEEE Press, 1984. 445 pages.

Produced for the IEEE Centennial, the major portion of this book is a compilation of names, citations, and biographical data of members of the IEEE who have been named to the Fellow grade during the organization's first hundred years. Winners of the Institute's (and its predecessors') medals and awards are also listed, along with Honorary Members and Past Presidents of the AIEE, IRE, and IEEE.

Cortada, James W. (comp.). *An Annotated Bibliography on the History of Data Processing*. Westport, CT: Greenwood Press, 1983. 216 pages.

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

Fisher, Franklin M., James W. McKie, and Richard B. Mancke. *IBM and the U.S. Data Processing Industry*. New York: Praeger Publishers, 1983. 532 pages.

Fisher, McKie, and Manke distilled some 104,000 pages of evidence, depositions, and testimony from the government's aborted 13-year antitrust suit against IBM to produce what they have termed "an economic history" of IBM's central role in the computer industry from the 1950s to 1980. By relying on the trial transcript, the authors have attempted to tell an objective, detailed, factual story, rather than popularize the computer industry's history or argue economic issues.

Fisher, McKie, and Manke are all economists who served as expert witnesses for IBM's defense in the antitrust case.

Mansfield, Jerry W. *The Nuclear Power Debate: A Guide to the Literature*. New York: Garland, 1984. 102 pages.

Billed by the publisher as "a starting point for concerned citizens hungry for information on one of the hot issues of the day," this annotated bibliography is arranged in three sections to simplify its use—"Pro-Nuclear," "Anti-Nuclear," and "Neutral." Each of the over 100 books listed is accompanied by full bilbiographic data and a lengthy annotation. Author, title, and subject indexes are included as well.

Jerry Mansfield is Library Director of the King Faisal Specialist Hospital and Research Centre, Riyadh, Saudi Arabia.

Moreau, Rene. *The Computer Comes of Age: The People, the Hardware, and the Software*. Cambridge, MA: MIT Press, 1984. Translated by J. Howlett. 240 pages.

Written for the nonspecialist, this book defines, explains, and dates the first formulations of the main concepts in computer science and covers the major phases in the evolution of software and hardware from the late 1940s to the early 1960s.

The book is divided into three chronological parts, the first of which, covering up to 1950, discusses the mechanization of problem solving. The second part (1950-1959) focuses on the beginnings of large-scale manufacturing of computers, and part three (1959-1963) looks at the growth of compatible families of computers and the development of main types of operating systems. Also included are chapters on the evolution of programming languages, on the current state and future trends of the industry, and an appendix on early work on computers in the USSR.

Rene Moreau is Director of Scientific Development, IBM France. His book was first published in France in 1981.

Pugh, Emerson W. *Memories that Shaped an Industry: Decisions Leading to IBM System/360*. Cambridge. MA: MIT Press, 1984. 336 pages.

This candid and personal history by an IBM insider chronicles the 25 year period during which the company evolved from the position of leading supplier of electromechanical punched-card equipment to dominance in the field of electronic computers. It describes IBM's response to the postwar challenge of electronics, its cooperative effort with MIT on an automated air defense system, the introduction of commercial ferrite core 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 magnetics and computer memory technologies, is a member of the research staff at the IBM Thomas J. Watson Research Center in Yorktown Heights, New York.

Ridley, Jack B. *Completing the Circuit: A Century of Electrical Education at MSM/UMR*. Columbia, MO: University of Missouri Printing Services, 1984. 320 pages.

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 1915, an interest in the technical applications of electricity was fostered by the School's first director, C. P. Williams, who reportedly demonstrated an arc lamp in the chemistry lab in 1876. So Ridley begins his account of the people and events that surround the first one hundred years of electrical education at MSM/UMR. He also supplements the narrative with a detailed alumni directory.

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

Rogers, Everett M. and Judith K. Larsen. *Silicon Valley Fever: Growth of High-Technology Culture*. New York: Basic Books, 1984. 302 pages.

The entrepreneurial spirit that governs the lifestyles and workstyles of Silicon Valley, an area known just three decades ago as the prune capital of America, is the focus of this book. Rogers and Larsen examine this flourishing world of the semiconductor computer chip from the technical, financial, organizational, socio-economic, 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. Larsen, who has worked in Silicon Valley as an engineer, is Senior Research Scientist at Cognos Associates, a Silicon Valley research and consulting firm.

From Overseas

Blondel, Christine. *Ampere et la creation de l'electrodynamique (1820-1827). (Ministere de L'Education Nationale Comites des Travaux Historiques et Scientifiques, Memoires de la Section des Sciences, 10) Paris: Bibliotheque Nationale, 1982. 202 pages.*

Keller, Wilhelm. *Hundert Jahre Fernsehen, 1883-1983.* Berlin/Offenbach: Verband Deutscher Elektrotechniker, 1983.

Stransky, Josef. *Od Bezdratove Telegrafie k Dnesni Radioelektronice* (From Wireless Telegraphy to Current Radio Electronics). Prague, 1984.

Articles

Allmer, Helmuth. "Das osterreichische Verbundnetz und seine Verbindungen zu West- und Osteuropa." *Elektrotechnik und Maschinenbau,* 100 (1983), 472-479.

Antcliffe, John. "Politics of the Airwaves: Party Political Broadcasts in the 1920s and 30s." *History Today,* 34 (March 1984), 4-10.

Atanasoff, John V. "Advent of Electronic Digital Computing." *Annals of the History of Computing,* 6 (1984), 229-282.

Atwood, Roy Alden. "Interlocking Newspaper and Telephone Company Directorates in Southeastern Iowa, 1900-1917." *Annals of Iowa,* 47 (1984), 255-269.

NEW PUBLICATIONS (cont.)

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Biegelmeier, Gottfried and Friedrich Smola. Osterreichische Beitrage zur Elektropathologie und zur Technik der Schutzmassnahmen gegen elektrische Unfalle." *Elektrotechnik und Maschinenbau,* 100 (1983), 480-484.

Blum, Joseph, *et al.* "Eloge: Walter W. Jacobs, 1914-1982." *Annals of the History of Computing,* 6 (1984), 100-106.

Boyer, Paul. "From Activism to Apathy: The American People and Nuclear Weapons, 1963-1980." *Journal of American History,* 70 (1983), 821-844.

Brainerd, John G. "The Soviets and the ENIAC." *Annals of the History of Computing,* 6 (1984), 155-156.

Cook, Gerald. "A Brief History of the Industrial Electronics Society of [the] IEEE." *IEEE Transactions on Industrial Electronics,* IE-31, No. 1 (February 1984), 1-2.

Dettmer, Roger, "[G. W. A. Dummer:] Prophet of the Integrated Circuit." *Electronics and Power,* 30 (1984), 279-281.

Freeman, Jon P. "The Evolution of High-Definition Television." *SMPTE Journal,* May 1984, 492ff.

Geddes, L. A. "A Short History of the Electrical Stimulation of Excitable Tissue, Including Electrotherapeutic Applications." Supplement to *The Physiologist,* 27, No. 1 (February 1984).

Giloi, W. K. "Die Entwicklung der Rechnerarchitektur von der von-Neumann-Maschine bis zu den Rechnern der 'funften Generation'." *Elektronische Rechenanlangen,* 26, No. 2 (1984), 55-70.

Glatzle, Wolfgang. "Entwicklung von A15-Supraleitern in Osterreich." *Elektrotechnik und Maschinenbau,* 101 (1984), 108-111.

Gold, R. D. "Cardiac Pacing—From Then to Now," *Medical Instrumentation,* 18 (1984), 15-21.

Hawker, Pat. "The Pioneers of Television." *Television,* 20 (1983), 273-279.

Hellerman, Herbert, *et al.* "The SPREAD Discussion Continued." *Annals of the History of Computing,* 6 (1984), 144-151.

"A History of Consumer Electronics Commemorating a Century of Electrical Progress." Special Issue of *IEEE Transactions on Consumer Electronics,* CE-30 (May 1984).

Katz, James E. "The Uses of Scientific Evidence in Congressional Policymaking: The Clinch River Breeder Reactor." *Science, Technology, and Human Values,* 9 (1984), 51-62.

Leon, B. J. "History of the [IEEE] Circuits and Systems Society." *IEEE Circuits and Systems Magazine,* 5, No. 4 (December 1983). 4-7.

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Mauchly, Kathleen R. "John Mauchly's Early Years." *Annals of the History of Computing,* 6 (1984), 116-138.

Needell, Allan A. "Nuclear Reactors and the Founding of the Brookhaven National Laboratory." *Historical Studies in the Physical Sciences,* 14 (1983), 93-122.

Owen, Edward L., *et al.* "AC Adjustable-Speed Drives with Electronic Power Converters—The Early Days." *IEEE Transactions on Industry Applications,* IA-20 (1984), 298-308.

Parvez, Zaheer. "Laser Nephelometry: Development, Clinical Application, and Future Prospects." *Medical Instrumentation,* 18 (1984), 127-130.

Physics in Medicine and Biology, 29 (February 1984), Special Issue on the history of radiotherapy.

Roberts, D. H. "Silicon Integrated Circuits: A Personal View of the First 25 Years." *Electronics and Power,* 30 (1984), 282-284.

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Schauer, Felix. "Die Entwicklung supraleitender Energieubertragungs-syteme." *Elektrotechnik und Maschinenbau,* 101 (1984), 105-108.

Senior, John E. "The Elusive Search for Electroanesthesia." *Medical Instrumentation,* 18 (1984), 86-87.

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Thomas, Leonard W. "EMC Twenty-Five Years Ago." *IEEE Transactions on Electromagnetic Compatibility,* EMC-25 (1983), 133-137.

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Tropp, Henry S. "Origin of the term 'Bit'." *Annals of the History of Computing,* 6 (1984), 152-155.

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Special issues

Elektrotechnik im Wandel der Zeit, (Geschichte der Elektrotechnik 1), Berlin/Offenbach: Verband Deutscher Elektrotechniker (VDE-Verlag), 1984

IEEE Transactions on Circuits and Systems, CAS-31, No. 1 (January 1984). Special Centennial issue. Includes historical articles on network synthesis and filter theory; circuit simulation; and teaching circuit theory.

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.

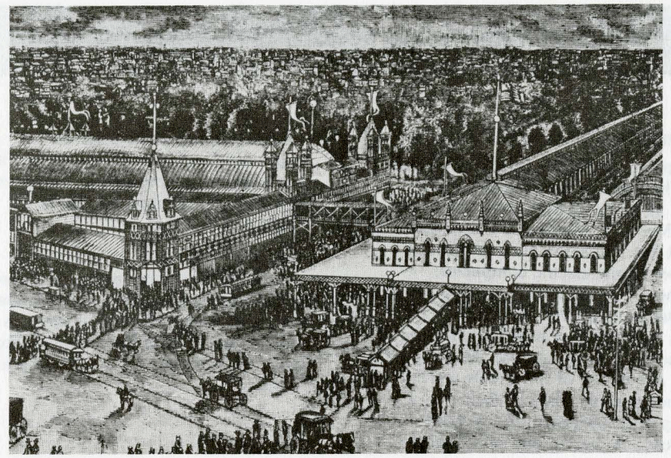
IEEE Transactions on Consumer Electronics, CE-30, No. 2 (May 1984). Special Centennial issue. Includes historical articles on the IEEE Consumer Electronics Society; televison systems, receivers, and design; and consumer radio and video technology.

1884 Revisited— Philadelphia in October

Bayla Singer

Milestones of the Electrical Age, a three-month temporary exhibition at the Franklin Institute Science Museum, celebrates 100 years of electrical progress and the long-standing link between the Franklin Institute and the electrical and electronic professions. In 1884, the Franklin Institute organized the first wholly Electrical Exhibition in America, and the newly-formed American Institute of Electrical Engineers (AIEE) held its first technical meeting at that Exhibition. The *Milestones* exhibition commemorates this dual centennial, and the opening is timed to coincide with the two-day IEEE-Franklin Insititute Centennial Technical Convocation celebrating the same event. Open to the public from October 8 to January 2, 1985, the exhibition is co-sponsored by the Franklin Institute Science Museum and the IEEE.

Reflecting the spirit of the 1884 Exhibition, which was as much salesmanship as science, the Exhibition will include exhibits prepared by corporate participants as well as historical and educational materials provided by the Franklin Institute. Responding to the challenge to show "what they would like to be remembered for, and where they are going in the future," corporate participants have proposed (among other subjects): a history of computing, electric control of industrial processes, microelectronics and photonics, an electric utility company history, magnetic induction flowmeters, consumer electronics, aviation electronics, and perhaps a biographical sketch of Elihu Thomson. The participating companies are AEL, AT&T, Bell Atlantic, Burndy Corporation, Burroughs, Fischer and Porter, General Electric, IBM, Leeds & Northrup, Philadelphia Electric Company, RCA, Smith Kline Beckman (Beckman Instruments Division), Sperry, Westinghouse, and Xerox.



Electrical World, vol. 4, no. 4, 26 July 1884.

A view of the International Electrical Exhibition buildings, Philadelphia, 1884

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 Elihu Thomson (cutaway 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 Section, founded in 1882, met regularly until about the time the AIEE Philadelphia Section was formed. In 1925, the Franklin Institute's Bartol 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 loran. 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. Bayla 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).

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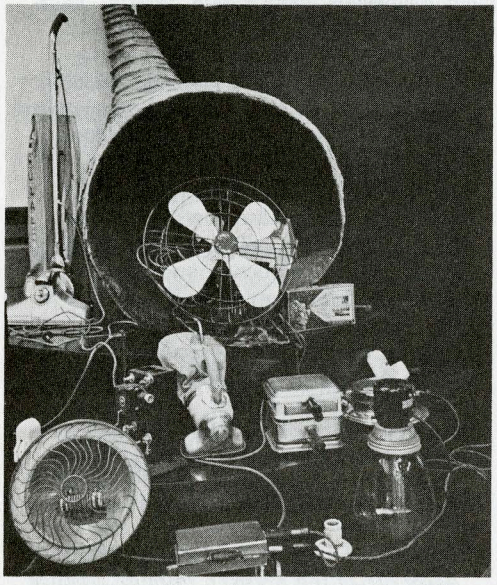
EXHIBITIONS AND MUSEUMS

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.



Div. of Historical & Cultural Affairs

A cornucopia of early electrical appliances in "Delaware Electrifies!"

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 loaner 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 turret crystal detector. For further information, contact SITES, Washington, DC, 20560 (202-357-3168).

1884 1984 A CENTURY OF ELECTRICAL PROGRESS

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