

# IEEE CENTER FOR THE HISTORY OF ELECTRICAL ENGINEERING

Newsletter

Number 11

Spring 1986

## Oral History Collections at the Center

Even before the founding of the Center for the History of Electrical Engineering in 1980, the IEEE had a strong commitment to documenting its history. One way in which this commitment has been fulfilled is through the support of various oral history projects with prominent scientists and engineers. The Center is fortunate to have four such collections.

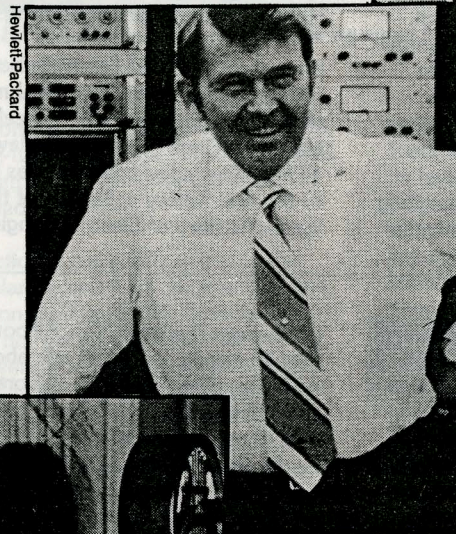
The earliest of these contains 21 interviews conducted by members of the IEEE History Committee from 1973 to 1976. Frank Polkinghorn, retired from Bell Laboratories, did most of the interviews, which were supported by the IEEE Life Member Fund. The collection is rich in material on Bell Labs and early radio. Among those interviewed from Bell Labs are Russell S. Ohl on semiconductor research in the 1930s, Warren P. Mason on quartz crystals and filters, and Arthur C. Keller on sound reproduction. Radio pioneers include Lloyd Espenschied of AT&T, Edwin Lee White of the Federal Radio Commission, and Leonard Fuller of the Federal Telegraph Co. Executives Frank W. Godsey of Westinghouse and Julian Z. Millar of Western Union were interviewed, and there is also a 1968 discussion with Harold Beverage and H.O. Peterson on their antenna research for RCA.

During the Polkinghorn project, Albert Pinsky and Mark Heyer of RCA's David Sarnoff Research Center interviewed nine former staff members in 1975-1976 and donated the

tapes to the IEEE. These interviews cover a variety of topics. Vladimir Zworykin, Humboldt Leverenz, Harold B. Law, and Paul K. Weimer discussed their work in television, James Hillier was interviewed on electron microscopy, Charles W. Mueller on the alloy transistor, Harry F. Olson on acoustics, Jan Rajchman on ferrite-core memories for computers, and Irving Wolff on radio detection used for navigation.

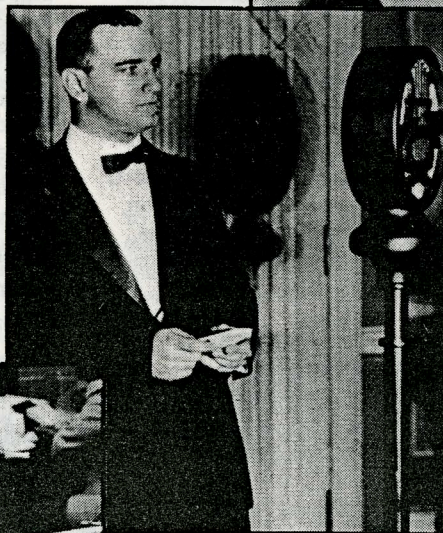


RCA



Hewlett-Packard

The Center's oral history collections include interviews with (from top) Vladimir Zworykin, William Hewlett, Alfred Goldsmith, and John Ryder

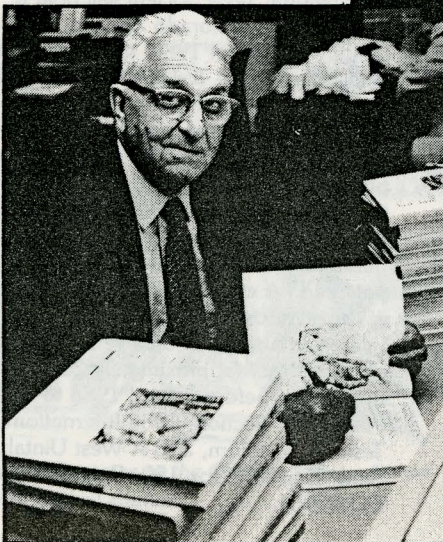


Smithsonian Institution

Interviews with former associates of the notable electronics engineer and educator Frederick Terman make up the fourth collection. Conducted by A. Michal McMahon in 1984 and supported by the Life Member Fund, the oral histories cover the careers of Marvin Chodorow, Edward L. Ginzton, William R. Hewlett, William R. Rambo, and C. Guy Suits. The interviews focus on the multifaceted relationships between these men and Terman at the Radio Research Laboratory at Harvard University during World War II and at Stanford University before and after the War (see Newsletter No. 8, Spring 1985).

The Center will continue to support oral history interviews as opportunities arise. For example, a one-hour interview with Harold A. Wheeler, radio pioneer and mainstay of the Hazeltine Company, was recently conducted (see the story on p. 2). These tapes will be transcribed as funding permits. In addition, the Center plans on preparing a catalogue of relevant oral history collections in the United States in order to make these resources of greater use to historians of electrical engineering.

A third collection focuses on the merger of the American Institute of Electrical Engineers and the Institute of Radio Engineers in 1963 to form the IEEE. With Life Member Fund support, George Sell, a graduate student in the history of science, talked to three members of the Merger Committee: John D. Ryder, Ronald McFarlan, and B. Richard Teare, Jr. The interviews, however, were not restricted to the merger. For example, Ryder also described his long career in engineering education and discussed the dominance of electronics over power engineering after World War II.

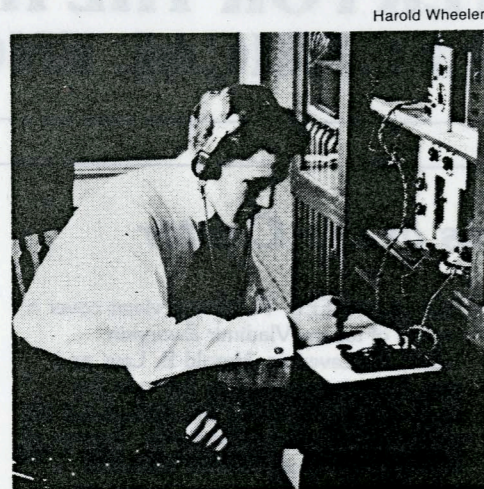


June Squire

**Harold A. Wheeler**

One of the more prolific radio and television inventors alive today is Dr. Harold A. Wheeler, Chief Scientist of the Hazeltine Corporation. At the age of 82, Wheeler still guides some research projects for the company his radio patents did so much to establish over 50 years ago.

Housed in Wheeler's office at Hazeltine is his extensive series of engineering notebooks, which he has kept continuously since 1917. They record the steps leading to his independent invention of the circuit used by Louis Alan Hazeltine in the Neutrodyne radio receiver in 1922, and Wheeler's inventions of the diode Automatic Volume Control (1925), used in today's AM radio receivers; the tuning meter (1926); and other improvements in the areas of radio, television, antennas, and test equipment. The notebooks are described in an appendix to Wheeler's *The Early Days of Wheeler and Hazeltine Corporation - Profiles in Radio and Electronics* (Greenlawn, NY: Hazeltine Corp, 1982), which provides a comprehensive history of his career. Supplementing that account is an hour-long interview with Wheeler, recently conducted



Harold Wheeler, 1915

by Ronald Kline of the Center for the History of Electrical Engineering.

Historians wishing to consult the Wheeler notebooks and related archival material should contact Harold A. Wheeler at the Hazeltine Corporation, Greenlawn, NY 11740. The taped interview has been added to the oral history collection of the Center for the History of Electrical Engineering.

**The Society of Manufacturing Engineers**

The Society of Manufacturing Engineers Paterson (NJ) Chapter 102, will hold a technical session on 7 April. The theme of the meeting is "Local Historic Manufacturing Sites," and Thorwald Torgersen, of the Society for Industrial Archaeology, will be the speaker. In his talk, Torgersen will discuss the Western Electric Plant in Kearny, NJ; the Weston Electric Instrument Co. in Newark; Edison's West Orange complex; and various generating plants on the Hackensack Meadows.

The session is open to everyone, and will be held at the Hasbrouck Heights Quality Inn, 283 Route 17 South (1/4 mile south of Route 46). A cocktail hour, followed by dinner, will begin at 5:30 pm; call C. Dorrie at 201-835-4691 for reservations. The meeting will begin at 8 pm.

**International Conference on the Evolution and Modern Aspects of Induction Machines**

The International Conference on the Evolution and Modern Aspects of Induction Machines will be held 8-11 July, in Torino, Italy. In celebration of the centennial of the invention of the induction motor by Galileo Ferraris and Nikola Tesla, the conference will include a session on the history of induction machines. Additionally, authors have been encouraged to include a historical section in their technical papers.

For further information, contact Professor Paolo Ferraris, Dipartimento di Elettrotecnica, Politecnico di Torino, C.so Duca degli Abruzzi 24, 10129 Torino, Italy.

**1986 International Tesla Symposium**

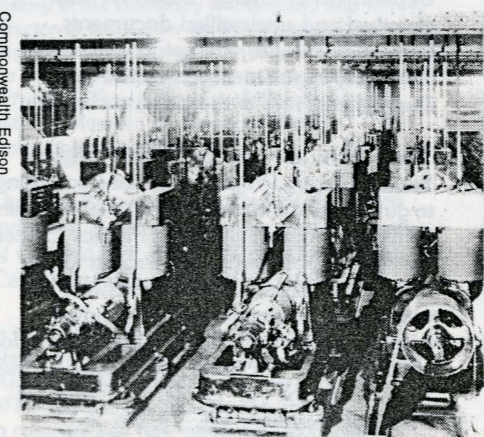
The IEEE Pikes Peak Section and the International Tesla Society will hold a conference in Colorado Springs, Colorado, 30 July-3 August 1986, titled "Towards an Understanding of Tesla's Contribution to Electrical Engineering," to commemorate the 100th anniversary of Tesla's first US patent, for an electric arc lamp. "The purpose of the symposium," according to the organizers, "is to provide a forum for the review and exchange of information pertaining to the many concepts Tesla patented." A call for papers to be presented at the symposium has been issued. Interested authors should send two copies of an abstract (approximately 250 words) of their paper before 1 April 1986 to IEEE Pikes Peak Section, 1986 International Tesla Symposium, 330-A West Uintah, Suite 115, P.O. Box 150, Colorado Springs, CO 80901.

**Archives Chronicle 122  
First Century of  
Two Edison Companies**

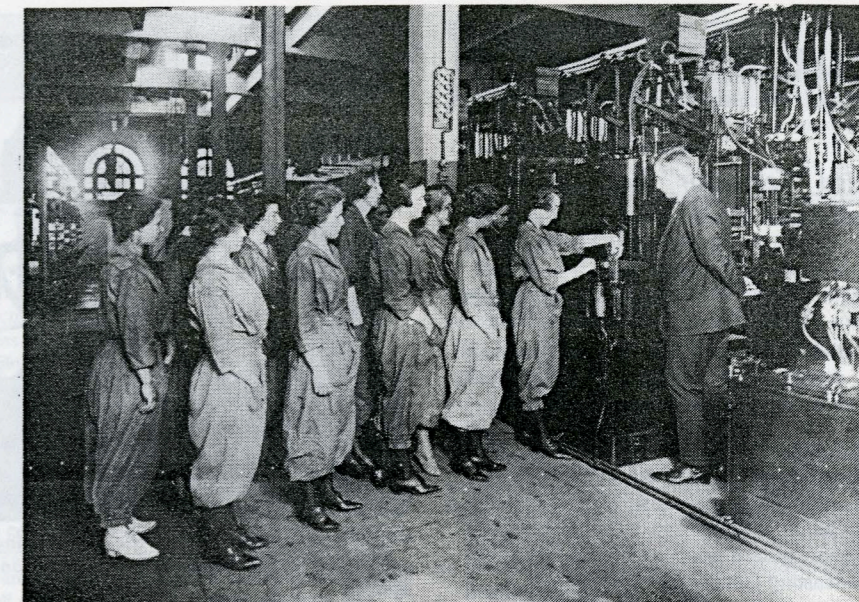
With the success of Edison's Pearl Street station in New York City in 1882, the age of the central station for the distribution of electric light and power came into being. Edison companies sprang up across the country, and many of them are now reaching the end of their first century of service. Two of these are the Commonwealth Edison Company of Chicago (CEC) and the Boston Edison Company, whose archives reveal a complex and fascinating history.

The Commonwealth Edison Company traces its roots to the Chicago Edison Company, founded in 1887. In August of that year, construction of the central station began on Adams Street, and, one year later, the plant went into operation with an initial capacity of 10,000 16-candlepower lamps. After Samuel Insull assumed the presidency of Chicago Edison in 1892, the company rapidly dominated the city's electric supply. Between 1892 and 1907, Chicago Edison acquired twenty local utilities, and, in 1907, merged with the Commonwealth Electric Company to form Commonwealth Edison. Over the next fifty years, Commonwealth Edison expanded beyond Chicago. In 1953, the major electric utilities of northern Illinois were formally consolidated with the company, and, in 1967, Central Illinois Gas and Electric joined CEC. Presently, the company serves a region encompassing 10,000 square miles.

The archives of Commonwealth Edison document the growth of this vast system. The 4,000 linear feet of records are almost evenly divided between the corporate records of CEC and those of the utilities and holding companies that merged with the parent firm, including the predecessors



Bank of dynamos at the Chicago Edison Adams Street central station



Boston Edison's Roslindale substation was operated by women during World War I. Some trainees are pictured here.

of these companies. Of the CEC materials, about one-half refer to the pre-1953 period, with the remainder covering the era of consolidated operations.

The collection is especially strong in the areas of plant accounting, engineering and construction, and corporate finance. Although not yet accessioned, the bulk of the engineering and construction records (contracts, work orders, purchase orders, line orders, etc.) and plant accounting records (ledgers, construction analysis, field inventories, etc.) is available to researchers. The archives also contain a large collection of photographs, company publications, and trade journals.

In 1886, one year before construction began in Chicago, the Edison Electric Illuminating Company of Boston (EEI) went into operation. The firm, which later became Boston Edison, served a 72-acre area in downtown Boston which included the Bijou Theatre, the first theatre in the country to be lit by incandescent lamps. Despite competition from other central stations and isolated plants in the city, EEI showed a profit by the end of the year and increased its load eightfold. This growth continued during 1887. The company paid its first dividend, ten miles of underground cable were laid, the first central station was expanded, and a second went on line at the end of the year.

Much of EEI's early history was shaped by Charles Leavitt Edgar, who joined EEI as a station manager in 1887 and later served as president from 1900 to 1932. In 1900, EEI's main rival was the Boston Electric Light Company, which operated an alternating-current plant that competed

with EEI's dc stations. In 1901, Boston Electric and EEI merged, and EEI absorbed its last competitor by the end of the year. Edgar also introduced engineering innovations in steam turbines and load balancing, and encouraged sound marketing strategies. Discounts were offered to prospective customers; electric vehicles, appliances, office equipment, and industrial machinery were promoted; and two radio stations were started in the early 1920s. In 1937, the company changed its name to Boston Edison, which embodies more than 70 utilities that originally operated in Boston and 39 surrounding communities.

The records of Boston Edison include financial, corporate, and legal material, such as stock ledgers, board of directors minutes, and rights-of-way, company publications, and a rich historical photograph collection. An artifact collection, particularly strong in metering equipment, is also maintained. Two projects for Boston Edison's centennial have drawn heavily on the archives: a commissioned history of the company, which has been published in abbreviated form as a special issue of the company magazine, and an abundantly-illustrated centennial calendar.

For further information on the records of Commonwealth Edison, contact the Archives, Commonwealth Edison Company, 3500 North California Avenue, Chicago, IL 60618. Information on Boston Edison's archives and centennial projects may be obtained from Priscilla Korell, Centennial Coordinator, Boston Edison Company, 800 Boylston Street, Boston, MA 02199 (617-424-2447), and Linda Feeney, Records Manager, at the above address (617-424-3565).

**MEETINGS**

**IEE History of Technology Group**

The Institution of Electrical Engineers' Professional Group Committee S7 (History of Technology) will hold several meetings in the upcoming months at the IEE's Savoy Place, London, headquarters. On 18 March, Dr. Brian Bowers, Science Museum, will present "From Pile to Pylon: The Supply Industry's New Museum Gallery of Manchester." The next meeting, on 3 April,

will feature Professor T.E. Allibone, of the City University, who will talk about "The AEI Long-Term Research Laboratory: An Industrial Experiment". On 29 May, "Hertz and Randall - Pioneers of Radiation," will be discussed by Dr. M.J. Lazarus, of Lancaster University.

The IEE's annual History of Electrical Engineering Weekend is scheduled for 4-6 July, in Edinburgh. For more information, contact Dr. A.F. Anderson, NEI Parsons, Heaton Works, Newcastle-upon-Tyne, England NE6 2YL.

**The Institute of Electrical and Electronics Engineers**

**IEEE History Committee—1986**

- Howard B. Hamilton, Chairman
- Thomas J. Aprille, Jr.
- James E. Brittain
- Jan Carr
- Harold Chestnut
- Nathan Cohn
- Harvey C. Cragon

- Bernard S. Finn
- F. Anthony Furfari
- Leslie A. Geddes
- Edward W. Herold
- Karle S. Packard
- Erwin Tomash
- Charles R. Wright

**Center for the History of Electrical Engineering**

Ronald R. Kline, Director  
Joyce E. Bedi, Curator  
Kathleen Hart, Research Assistant  
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Telephone: (212) 705-7501

**BRIEFS**

**Baird "Televisor" Scrapbook Donated**

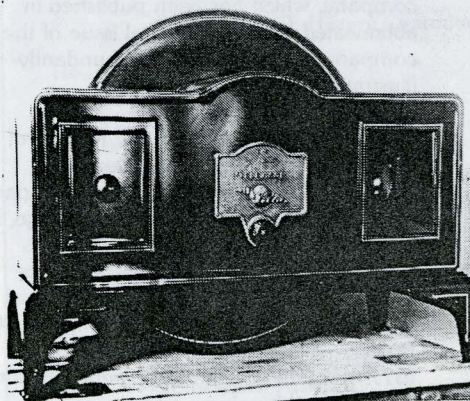
Crude as it is in its initial stage, Mr. Baird's invention looks like being the most effective means yet devised of keeping the children at home.

London Sunday Pictorial  
10 August 1930

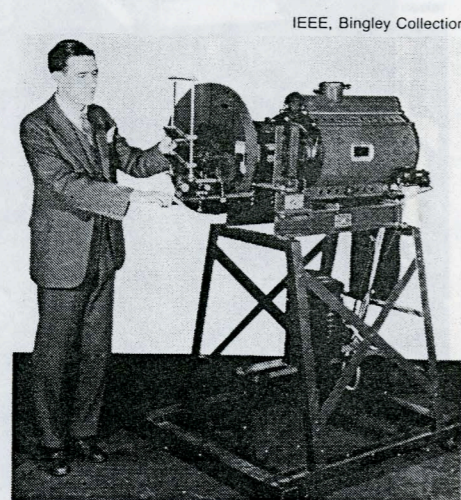
John Logie Baird was unquestionably one of the pioneers of television. Within five years, he went from transmitting silhouettes in his lab in 1924 to having his mechanical television system adopted by the British Broadcasting Corporation for regular experimental broadcasts in London in 1929. To receive these programs, Baird Television, Ltd. manufactured the "Televisor," the main components of which were a light aluminum disc, 20 inches in diameter, perforated with a spiral of 30 openings; a motor to rotate the disc; an automatic synchronizing gear to keep the picture in step; and a neon lamp. At the transmitting end, a similar arrangement was used. This mechanical system was used by the BBC until 1935.

A scrapbook of photographs, advertising material, catalogues, instruction booklets, and newspaper clippings on the "Televisor," dating from about 1930, was recently donated to the Center for the History of Electrical Engineering by the family of Frank J. Bingley. A television pioneer in his own right, Bingley started his career at Baird Television in London in 1927. He left the company in 1931, and, in subsequent positions with Philco and RCA, went on to develop all-electronic, color, three-dimensional X-ray, and spacecraft television systems.

Frank Bingley was made a Fellow of the IRE in 1950, "in recognition of his

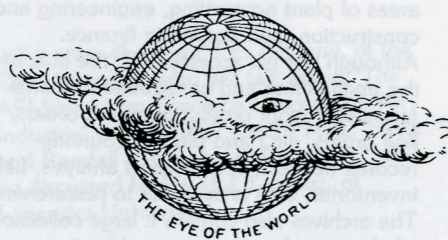


Baird "Televisor" sported the company logo, "The Eye of the World"



Frank Bingley with some of the transmitting equipment for Baird's mechanical television system

contributions in the field of television broadcast engineering," and received the Vladimir Zworykin Award "for contributions to colorimetric science as applied to television." His scrapbook on the "Televisor," however, should also be cited as a lasting contribution to the study of television's beginnings.



**Silicon Valley Project**

Stanford University Libraries, in conjunction with Stanford's History of Science Program and Program in Values, Technology, Science and Society, has recently announced its "Stanford and the Silicon Valley Project." This new program to document the history of microelectronics in Silicon Valley plans to identify, select, and acquire "published and unpublished materials of value to present and future research concerned with the genesis and development of the Silicon Valley, Stanford's role in the process, and the symbiotic relationship between science and science-based technology in general."

Items of particular interest include research notes, unpublished professional correspondence, transcripts or recordings of interviews and speeches, diaries, journals, project files, company brochures, technical reports, product documentation, photographs, and oral histories. Documents and recordings collected from companies and individuals during the Project will be

IEEE, Bingley Collection

deposited in the Department of Special Collections, Stanford University Archives, which will maintain the collections and make them available to qualified researchers.

If you know of relevant material or would like more information about the Project, contact Dr. Henry Lowood, Department of Special Collections, Stanford University Libraries, Stanford, CA 94305 (415-497-4054).

**Regional Milestones**

The IEEE Electrical Engineering Milestones Program has been expanded to honor achievements of local or regional significance in the history of electrical and electronics engineering. The guidelines for regional Milestones are the same as those for national and international ones, except that the historical significance of the achievement must be "local or regional (pertaining to a State or geographic region)." Additionally, the bronze plaque marking the site of the Milestone will be inscribed with the name of the locality being honored. Guidelines and procedures for the IEEE Electrical Engineering Milestones program are available from the Center for the History of Electrical Engineering.

**Sandia History Project**

The first volume of a multi-volume history of the Sandia National Laboratories is scheduled for completion in 1989. Researched and written by Necah S. Furman, a corporate historian, the series will cover the history of the technological developments and personnel of the Laboratory from its founding in July 1945 to the present. The Laboratory began as an ordnance-engineering division of the Los Alamos complex and is now the nation's largest nuclear weapons laboratory and the largest laboratory operated by the Department of Energy. Based on both classified and unclassified documents, Furman's work will attempt to "place the laboratory in national perspective and illuminate its role in the defense complex."

The book is just one facet of the ongoing Sandia History Project, organized according to guidelines developed for DOE laboratories by the American Institute of Physics' Center for History of Physics. The Project also plans to establish a working archives and oral history collection, and to conduct training sessions in records management for lab personnel. For more information on the Project, see the AIP Center for History of Physics Newsletter, Vol. 27, No. 2, December 1985, or write Necah Furman at Sandia National Laboratories, 3160A, P.O. Box 5800, Albuquerque, NM 87185.

**NEW PUBLICATIONS**

The Newsletter's "Publications" section was prepared with the assistance of Thomas J. Higgins of the University of Wisconsin.

**Books**

Robert Friedel and Paul Israel, with Bernard S. Finn. *Edison's Electric Light: Biography of an Invention*. New Brunswick, NJ: Rutgers University Press, 1986. 256 pp.

*Edison's Electric Light* is a welcome addition to the growing literature on one of America's most popular folk heroes. Based on the most extensive use made to date of the voluminous Edison archives, the book analyzes the work of Edison and the Menlo Park "gang" in their five-year quest to devise a complete electric lighting system. The authors focus much of their attention on the events leading up to the successful high-resistance, carbon-filament lamp of October 1879, but the remainder of the story, that of the following three years of the development of a commercial system, is not neglected.

We learn how they got the "bugs" out of early installations aboard the S.S. *Columbia*, and at the Holborn Viaduct in London, international exhibitions, and several factories - before the celebrated opening of the Pearl Street Station in 1882. Throughout the narrative, the authors question some of the commonly held beliefs about Edison, such as the ideas that he was primarily a systems builder and that Menlo Park was the model for the 20th-century R&D laboratory.

The book combines a vivid style with sound scholarship. Particularly impressive is the exhaustive use of "non-verbal" evidence from the Menlo Park notebooks. These drawings show us, more than anything else, what the "Wizard" and his gang were up to in these extremely fruitful years.

Robert Friedel is an Associate Professor of History at the University of Maryland and former Director of the Center for the History of Electrical Engineering. Paul Israel is an Assistant Editor for the Thomas A. Edison Papers at Rutgers University. Bernard S. Finn is Curator of Electricity at the National Museum of American History, Smithsonian Institution.

Leonard Reich. *The Making of American Industrial Research: Science and Business at GE and Bell, 1876-1926*. Cambridge: Cambridge University Press, 1985. 309 pp.

In this seminal book on the history of United States industrial research, Reich concentrates on the research laboratories of General Electric and AT&T. Reich chose to study GE and Bell in order to compare two very influential laboratories. And, because the companies had different structures, operating methods, and market positions, but similar research interests, he can

also explore the relationship between corporate structure and industrial research.

Founded in 1900, the GE Research and Development Laboratory was primarily established to help protect the company's dominance in the electric lighting business. Focusing on the early years of the Laboratory, through its unstable beginnings up until the First World War, Reich points out that the Laboratory became both a stimulus and an example for American industrial research laboratories. The AT&T Research Branch began in a similar fashion. The company's directors formed the department in response to concern about interference from competitors in the company's central market of wired-telephone service. This laboratory not only advanced and controlled new technologies, but also consolidated itself within the AT&T corporate structure and supplied the Bell System with other technological advancements for the industry.

By comparing the laboratories at GE and Bell, as well as those of other companies, Reich concludes that "successful industrial research involves every part of a company's organization and that the research has to be tailored to corporate structure. The relationship between research and development, engineers, production, finance, sales, and other company operations is complex and often subtle. No rules can be made, only lessons learned - here through history" (p. 257).

Leonard S. Reich is Associate Director and Editor of the Thomas A. Edison Papers Project and Associate Professor of History at Rutgers University.

George Wise. *Willis R. Whitney, General Electric and the Origins of U.S. Industrial Research*. New York: Columbia University Press, 1985. 375 pp.

Through extensive use of business records, correspondence, diaries, and personal interviews, George Wise has written a compelling biography of research pioneer Willis R. Whitney. As its title indicates, the book is more than a standard scientific biography. By skillfully integrating descriptions of Whitney's personal and professional lives into a single narrative, Wise has managed to portray how the first large-scale industrial research laboratory in the United States was shaped and guided mainly by the personality of one man.

Wise lays a firm foundation for the book in his discussion of Whitney's childhood, education at MIT and Leipzig, and brief teaching career at MIT. Then, when Whitney becomes the first director of the General Electric Research Laboratory in 1900, we are in a good position to watch him decide between academia and industry and develop a lifelong and influential style of managing industrial research. A refreshing aspect of the book is Wise's frankness in handling potentially embarrassing episodes in Whitney's career, particularly the two periods in which he had to reconsider his role at the Laboratory due to mental breakdowns. In these and other parts

of the book, Wise strives to understand the complex personality of Whitney and to place his achievements (and failures) in the context of the history of industrial research.

George Wise is the Research and Development Historian at the General Electric Research and Development Center in Schenectady, New York.

**Other Recent Books**

Rondo Cameron and Andre J. Millard. *Technology Assessment: A Historical Approach*. Dubuque, IA: Kendall Hunt Publishing Co., 1985. 37 pp.

Robert S. Harding. *Register of the George H. Clark Radioana Collection, c. 1880-1950*. Washington, DC: Archives Center, National Museum of American History, Smithsonian Institution, 1985. 90 pp.

Marvin Hobbs. *E.H. Scott - The Dean of DX: A History of Classic Radios*. Chicago: North Frontier Press, 1984. 169 pp.

David Jones. *Urban Transit Policy: An Economic and Political History*. Englewood Cliffs, NJ: Prentice-Hall, 1985. 192 pp.

Robin E. Rider and Henry E. Lowood. *Guide to Sources in Northern California for History of Science and Technology*. Berkeley, CA: Office for History of Science and Technology, University of California, 1985. 194 pp.

John N. Schacht. *The Making of Telephone Unionism, 1920-1947*. New Brunswick, NJ: Rutgers University Press, 1985. 256 pp.

**Articles**

Anderson, A.F. "William Henley (1813-1882): Imagination without Discipline," *Electronics & Power*, 31 (1985), 593-597.

Balzer, Robert. "A 15 Year Perspective on Automatic Programming," *IEEE Transactions on Software Engineering*, SE-11 (Nov. 1985), 1257-1268.

Bell, Gwen and C. Gordon Bell. "Digging for Computer 'Gold' (in Computer Archaeology)," *IEEE Spectrum*, 22, No. 12 (Dec. 1985), 56-62.

Blondel, Christine. "Ampere and the Programming of Research," *Isis*, 76 (1985), 559-561.

Brander, R.W. "Evolution of (Telecommunications) System X - A Review," *British Telecommunications Engineering*, 3 (Jan. 1985), 223-225.

Brittain, James E. "(A History of) The Yagi-Uda Antenna," *Proceedings of the Radio Club of America*, 59, No. 2 (Nov. 1985), 7-10.

## NEW PUBLICATIONS (cont.)

- Brittain, James E. "From Computer to Electrical Engineer: The Remarkable Career of Edith Clarke," *IEEE Transactions on Education*, E-28 (Nov. 1985), 184-189.
- Cohen, I. Bernard. "Home of the New Dinosaurs (Boston's Computer Museum)," *American Heritage of Invention & Technology*, 1, No. 3 (Spring 1986), 64.
- Dahl, Per F. "Kamerlingh Onnes and the Discovery of Superconductivity: The Leyden Years, 1911-1914," *Historical Studies in the Physical Sciences*, 15 (1985), 1-37.
- Fox, Robert and Anna Guagnini. "Britain in Perspective: the European Context of Industrial Training and Innovation, 1880-1914," *History and Technology*, 2 (1985), 133-150.
- Friedel, Robert. "Silver from Clay (Charles Hall and the Aluminum Process)," *American Heritage of Invention & Technology*, 1, No. 3 (Spring 1986), 51-57.
- Gooding, David. "Experiment and Concept Formation in Electromagnetic Science and Technology in England in the 1820s," *History and Technology*, 2 (1985), 151-176.
- Kargon, Robert. "Inventing Caltech," *American Heritage of Invention & Technology*, 1, No. 3 (Spring 1986), 24-30.
- Kipnis, Naum. "Galvanism: A Form of Electricity or a Distinct Fluid?" *Bakken Library Electric Quarterly*, 7, No. 4 (Fall 1985), 2-4.
- Kleinrath, Hans. "Laudatio anlässlich der 90. Wiederkehr des Geburtstages von Herrn Univ.-Prof. Dr. mult. Heinrich Sequenz," *Elektrotechnik und Maschinenbau*, 102 (1985), 347-349.
- Misa, Thomas J. "Military Needs, Commercial Realities, and the Development of the Transistor, 1948-1958," in *Military Enterprise and Technological Change*, Merritt Roe Smith, ed. Cambridge, MA: MIT Press, 1985.
- Pake, George E. "Research at Xerox PARC (Palo Alto Research Center): A Founder's Assessment," *IEEE Spectrum*, 22, No. 10 (Oct. 1985), 54-61.
- Payne, D.J. and J. Davidson. "A Century of Electrical and Lighting Installations (in Britain)," *Electronics & Power*, 31 (1985), 582-587.
- Perry, Tekla S. and Paul Wallich. "Inside the (Xerox) PARC (Palo Alto Research Center): The 'Information Architects,'" *IEEE Spectrum*, 22, No. 10 (Oct. 1985), 62-75.
- Rasek, E. "Über die historische Entwicklung der Datenspeichertechnik kauf Magnetband," *Elektronische Rechenanlagen*, 27 (1985), 221-235.
- Robertson, Lawrence M. "An Autobiography," *IEEE Denver Section Western Engineer*, 69, No. 6 (June 1985), 8-9, 12-14; No. 7 (July 1985), 12-14; No. 8 (Aug. 1985), 4-6.
- Ruse, Marjory. "Oh Those Live and Lively Days (of Television)," *Journal of the Royal Television Society*, 22 (1985), 197-198.
- Singleton, Thomas. "30 Years of ITV," *Journal of the Royal Television Society*, 22 (1985), 189-190.
- Strum, Harvey. "The Association for Applied Solar Energy/Solar Energy Society," *Technology & Culture*, 26 (1985), 571-578.
- Townsend, Boris. "Significant Developments in Television Engineering," *Journal of the Royal Television Society*, 22 (1985), 201-203.
- Wakefield, K.S. "(A Short History of) Submarine Cables and Cable Ships," *Electronics & Power*, 31, (1985), 652-654.
- Wolff, Michael F. "The Secret Six-Month Project (to Manufacture the First Commercial Transistor Radio)," *IEEE Spectrum*, 22, No. 12 (Dec. 1985), 64-69.
- Unpublished Manuscripts
- The following papers on electrical history were presented at the 1985 meeting of the Society for the History of Technology in Dearborn, Michigan, 17-19 October.
- Gail Cooper (University of California, Santa Barbara), "Manufactured Weather: A History of Air Conditioning in America, 1900-1980."
- Richard Giordano (Columbia University), "The Emergence of the Discipline of Computer Science: Boundary Maintenance, Sponsored Research, and Business."
- Norbert Goldfield (CIGNA Corporation), "The Diffusion of VDT Technology in the Workplace."
- Three papers on the theme of *Historian as Translator: The Work of Hugh G.J. Aitken* were given during the Keynote Session.
- Thomas Cochran (University of Pennsylvania), "Hugh G.J. Aitken and

the Research Center in Entrepreneurial History"

- Merritt Roe Smith (MIT), "Aitken's Taylorism at the Watertown Arsenal"
- Leonard S. Reich (Thomas A. Edison Papers, Rutgers University), "Aitken's *The Continuous Wave*"

The Jovians, SHOT's special interest group in electrical history, sponsored a session on *Edison as Businessman and Entrepreneur* which included

- Joseph Sullivan (Thomas A. Edison Papers, Rutgers University), "Edison and Electrical Manufacturing: An Example of Decentralized Administration"
- Mary Ann Hellrigel (Thomas A. Edison Papers, Rutgers University), "To Light America: The Thomas Edison Central Station, Construction Department"
- Andre J. Millard (Bentley College), "Thomas Edison and the Battle of the Systems Revisited"

The following papers relating to the history of electrotechnology were presented at the annual meeting of the History of Science Society, held in Bloomington, Indiana, 31 October-3 November 1985.

- Bruce Hunt (University of Texas, Austin), "Heaviside the Telegrapher: Submarine Cables and Field Theory in Victorian Britain"
- Larry Owens (University of Massachusetts, Amherst), "Vannevar Bush and the Frontiers of Invention: Patents and Political Economy in the 1930s"
- Regis Cabral (University of Chicago), "The Brazilian Reaction to the First Use of Atomic Energy"
- Thomas Park Hughes (University of Pennsylvania), "The Seamless Web: Technology, Science, Etcetera, Etcetera, Etcetera"
- Lisa Mae Robinson (University of Pennsylvania), "Experimental Style in American Science: The Electroanalytical Techniques of Edgar Fahs Smith"

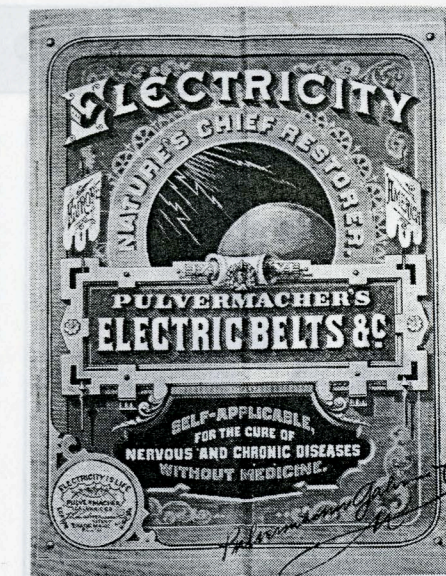
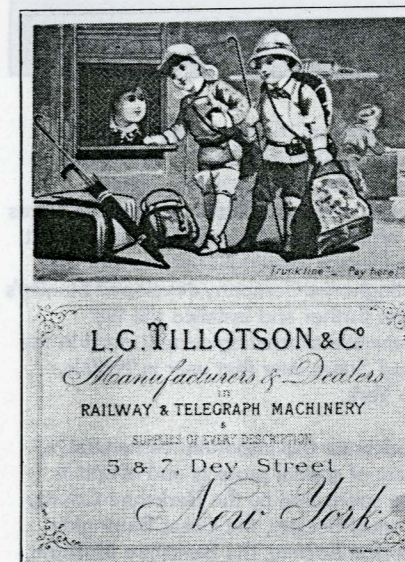
The following papers on electrotechnical history were presented at the 10th Annual Meeting of the Society for Social Studies of Science, in Troy, New York, 24-27 October 1985.

- Douglas, Susan (Hampshire College). "The Role of Amateurs in the Formation of Radio Networks."
- Leslie, Stuart (Johns Hopkins University). "Scientists' Role in Industrial Research Laboratories."
- Rose, Mark (Michigan Technological University). "On the Formation of Electric Networks in Denver and Kansas City."

## Warshaw Collection of Business Americana

One of the more unusual – and fascinating – resources of the National Museum of American History, Smithsonian Institution, is the Warshaw Collection of Business Americana. Isadore Warshaw, a New York City rare book collector, began gathering advertising material around 1928. In addition to the obvious historical value of these items which documented growth, change, and demise in American businesses, he sensed a practical value as well, and often used the collection in settling trademark and brand name disputes.

Warshaw organized his "Business Americana" by some 500 subjects – acoustics, air conditioning, aluminum, aviation, ball bearings, corsets, electricity, hats, industrial belting, Niagara Falls, science, and sex all found a spot. He collected bills, posters, receipts, catalogues, letters, photographs, trade cards, pamphlets, handbills, and just about anything else with a logo on it. By the time the Smithsonian purchased the collection in 1967, it contained about two million pieces.

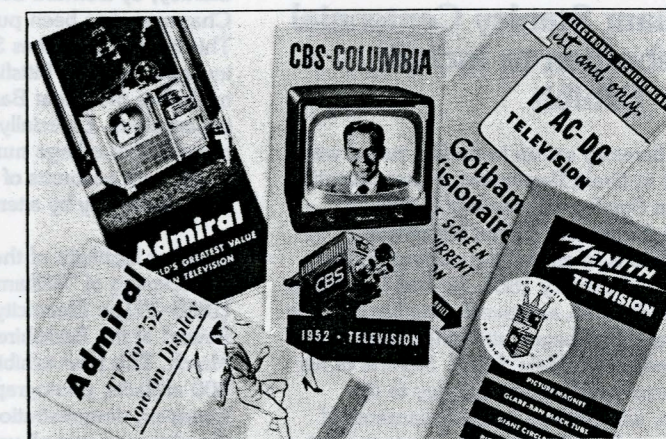


The accompanying photographs illustrate some of the material to be found in the approximately 35 linear feet of material devoted exclusively to electrical subjects. For further information on the Warshaw

Collection, contact Lorene Mayo, Archives Center, National Museum of American History, Smithsonian Institution, Washington, DC 20560 (202-357-2424).



Photos by J.E. Bedi, courtesy Smithsonian Institution



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

Smithsonian Institution



William Stanley, c. 1900

### William Stanley Centennial Celebration to Include New Exhibit

In a laboratory set up in an idle rubberwear factory in Great Barrington, Massachusetts, William Stanley, on contract to the Westinghouse Co., began his pivotal experiments in alternating current late in 1885. By February 1886, he had his steam engine, dynamo, and transformers in working order and had begun stringing wires along elm trees down Main Street. Several of his improved transformers, the key to the system, were placed in the basements of buildings along the way. The system went

into action on 16 March 1886, and, on Saturday, 20 March 1886, Stanley held a "gala" public demonstration, lighting numerous 150-candlepower lamps in stores and offices along Main Street. After a visit from George Westinghouse in April, the Westinghouse Company developed Stanley's system further and installed the first commercial alternating-current plant in the United States later that year in Buffalo, New York.

To celebrate this important centennial, a variety of special projects and events is being sponsored by the Berkshire County Historical Society, the Great Barrington Historical Society, the Berkshire Museum, General Electric, and the Berkshire Section of the IEEE. A postal cachet envelope will be issued, and lectures will be given by Edward Owen, on 19 March, at the Great Barrington Historical Society, and by historian Thomas Hughes, on 21 March, at the Berkshire Museum. In addition, *William Stanley*, by Bernard Drew and Gerard Chapman, has been published recently. This booklet describes Stanley's later inventive work in Pittsfield, Massachusetts, as well as the Great Barrington experiments. Especially interesting is the reprinting of a large number of local newspaper accounts of Stanley's progress in lighting the city by alternating current.

Another highlight of the celebration will be the opening of "William Stanley (1858-1916): Electricity for Light, Heat and Power" at the Berkshire Museum on 16 March. This new exhibit will include nearly 100 artifacts, photographs, diagrams, hands-on demonstrations, and text, to give the visitor an overall understanding of

William Stanley and his work. One of the gems of the show is a transformer which curator James Parrish believes to be one of the original nineteen made by Stanley.


Other sections of the exhibit will focus on Stanley's contributions to the electric light and power industry, through both his inventions and the companies which he founded. Lighting apparatus, meters (including a discussion of Stanley's unsuccessful patent battle with Oliver Shallenberger over a watt-hour meter), and long-distance power transmission are just some of the topics to be covered. Finally, the exhibit will also include a look at one of Stanley's little-known inventions - the vacuum bottle, still made today under Stanley's original patent.

"William Stanley" will run until 10 June 1986. For more information, contact James Parrish, Berkshire Museum, 39 South Street, Pittsfield, MA 01201 (413-443-7171). Copies of the booklet, *William Stanley*, are available, at a cost of \$3.50 each, from the Berkshire County Historical Society, 780 Holmes Road, Pittsfield, MA 01201.

### Thanks!

We want to thank all of those who have become Friends of the Center for the History of Electrical Engineering. Nearly 150 of you have joined since the Friends was established at the end of last year. As this support continues to grow, we will be able to better serve your interest and efforts in electrical engineering history.

Thank you again for this fine beginning.

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