IEEE
Center for the History of Electrical Engineering

Newsletter No. 24 Summer 1990

The Center's First Decade

The Center for the History of Electrical Engineering was founded by the IEEE in August 1980 to promote the study and understanding of the history of electrical science and technology. Through programs designed to serve engineers, historians, and the general public, the Center serves as a clearing-house for information on all types of material relating to the past and present of electrical engineering. To launch the Center's second decade, this article offers a look back at the programs and staff of the first 10 years.

Research and Archival Services

Historical research has been the backbone of the Center's programs, especially exhibits, publications, and Electrical Engineering Milestones. The staff also provides reference services and assists researchers who wish to use the archives of the IEEE and its predecessor organizations, the American Institute of Electrical Engineers and the Institute of Radio Engineers. The archival collections are supplemented by extensive research files and a growing photograph collection. With a network of contacts in universities, museums, and corporations, the Center staff also assists individuals with the placement of papers and/or artifacts and advises on historical projects.

Exhibits and Publications

The exhibits program has been an important part of the effort to foster a greater awareness of the scientific, technical, and cultural heritage of electrical engineering, both within the profession and more broadly. About every three years, the Center has produced a traveling exhibit which circulates nationally. These have included *Lines and Waves: Faraday, Maxwell, and 150 Years of Electro-magnetism* (1981), *A Century of Electricals* (1984), *Edison after the Electric Light: The Challenge of Success* (1987), and, now in development, *Through a Glass Brightly: A History of Television in America*. A special temporary exhibit, *From Inventor to Scientist: Elihu Thomson, 1885-1910*, was installed at Thomson's former home in Swampscott, MA, in 1987. In addition, the Center mounts changing displays in the United Engineering Center.

The Center's publications program has reflected many of its interests. The *Newsletter*, published three times each year since 1982, reports on the activities of the Center and on new resources and projects in electrical history. In addition, special publications have been issued from time to time. For example, catalogues were produced for two of the Center's exhibits (*Lines and Waves* and *A Century of Electricals*) and a booklet commemorating the 100th anniversary of Edison's Pearl Street station was published in 1982. Aids to scholars have included *Recent Titles in Electrical History: A Selective Bibliography, 1982-1985* (1988), and *Sources in Electrical History*, Vol. 1, *Archives and Manuscript Collections in U.S. Repositories* (1989). Volume 2 of the *Sources* series, *Oral History Collections in U.S. Repositories*, is near completion.

IEEE Center for the History of Electrical Engineering

Visitors at the Center's first exhibit, Lines and Waves, *in 1981. From* Newsletter *No. 1.*

Special Projects

The Center has also cooperated with other institutions on special projects. Two examples can illustrate the variety of these. The Center was a participant in the Laser History Project, which was founded in 1982 to document the scientific, engineering, commercial, and military aspects of the history of lasers and masers. The Center's role in the Project was varied, including such activities as assisting with the preparation of *The Laser at 25* (a traveling exhibit), transcribing oral history interviews conducted by the Project's director, and surveying businesses and universities concerning their archival holdings in this field.

In an international project co-sponsored by the Center and the American Institute of Physics Center for History of Physics in 1987, a collection of letters of Australian physicist Sir Richard Threlfall was indexed and microfilmed. As the first

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Briefs . . .

IEEE Fellowship Awarded

The 1990-91 IEEE Fellowship in Electrical History has been awarded to Mark Henry Clark, a graduate student in the history of technology at the University of Delaware. Clark is writing his dissertation on the history of magnetic recording. He described his research as follows:

> The history of magnetic recording can be interpreted by focusing on a number of distinct themes. They are, in rough chronological order, the nature of invention and development, the impact of government sponsorship on research, national differences in technological style and resulting technological transfer, and, finally, the social impact of technology. In terms of invention, one can explore the question of recognition of artifact over idea as the source of future development.

The IEEE Fellowship in Electrical History is funded by the IEEE Life Member Fund and administered by the IEEE History Committee and the Center for the History of Electrical Engineering. The Fellowship supports up to one year of research at the pre- or post-doctoral level with a stipend of $14,000. For more information and application forms, contact the Center for the History of Electrical Engineering, 345 East 47th Street, New York, NY 10017 (212-705-7501).

Unix Oral History

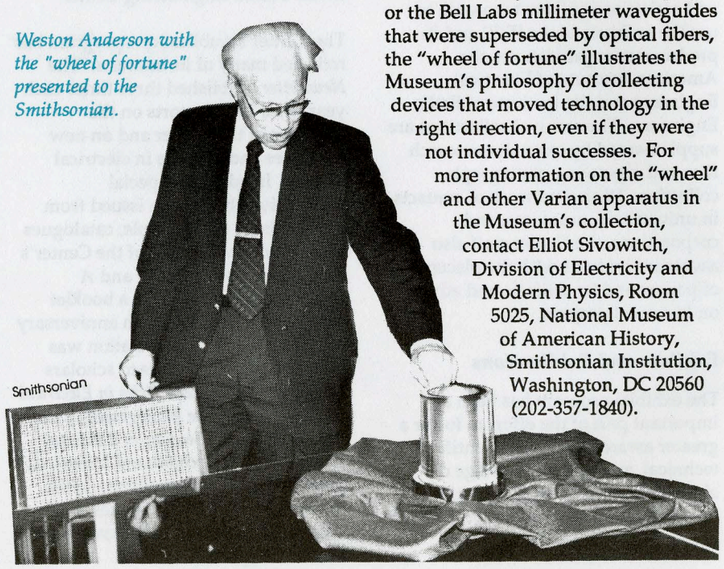
An oral history project to document the development of the Unix system has been initiated by AT&T Bell Laboratories, the birthplace of Unix. The year-long project will include interviews with such Unix pioneers as Dennis Ritchie, Ken Thompson, and Doug McIlroy. The first cassette, titled "Release 0, The Beginning," is available free of charge by contacting Michael D. Miller, AT&T Bell Laboratories, Room 1L-414, JFK Parkway, Short Hills, NJ 07078 (201-564-3836).

Smithsonian Receives Varian "Wheel of Fortune"

The Smithsonian Institution's National Museum of American History has added a "wheel of fortune" from Varian Associates to its store of recent technical devices. The "wheel" was designed by Weston Anderson of Varian as an improved means of getting rapid scanning across a frequency range in order to detect resonances with magnetically excited atoms.

Proceeding out from the center of the wheel, successive bands were etched with incrementally increasing numbers of black and white lines. Light shining on the spinning wheel produced a series of reflected on-off beams at slightly different audio frequencies. These were detected by photoelectric cells, and their output was used to modulate a signal from a radio frequency oscillator which fed an NMR (nuclear magnetic resonance) probe. But, even before the device could be used, Anderson and Richard Ernst had a better idea, which formed the basis of a patent used in virtually all present-day magnetic resonance spectrometers and imaging instruments.

Like Elisha Gray's harmonic telegraph or the Bell Labs millimeter waveguides that were superseded by optical fibers, the "wheel of fortune" illustrates the Museum's philosophy of collecting devices that moved technology in the right direction, even if they were not individual successes. For more information on the "wheel" and other Varian apparatus in the Museum's collection, contact Elliot Sivowitch, Division of Electricity and Modern Physics, Room 5025, National Museum of American History, Smithsonian Institution, Washington, DC 20560 (202-357-1840).



Weston Anderson with the "wheel of fortune" presented to the Smithsonian.

The *Newsletter* reports on the activities of the Center and on new resources and projects in electrical history. It is published three times each year by the Center for the History of Electrical Engineering, Institute of Electrical and Electronics Engineers, 345 East 47th Street, New York, NY 10017 (212-705-7501).

UK Plans for Faraday Bicentenary

Brian Bowers

Michael Faraday, "the man who made electrical engineering possible..." That description was given by Sir William Bragg in 1931, on the occasion of the celebrations marking the centenary of the discovery of electromagnetic induction. Faraday's discovery led directly to the generator and the transformer, and so to the whole world of electrical engineering. Earlier, in 1821, Faraday had been the first to produce continuous mechanical movement from a magnet and an electric current. Later, his thoughts on magnetic and electric fields and forces inspired Maxwell to his electro-magnetic theory, and prepared the way for Hertz, Marconi, and radio.

A blacksmith's son, and trained as a bookbinder, Faraday had a thirst for scientific discovery. Most of his working life was spent at the Royal Institution in London. He began there as assistant to Sir Humphry Davy, and was soon invited to join Davy on a tour visiting the leading scientists of France, Switzerland, and Italy (an enlightened Napoleon allowed the visit even though Britain and France were at war). The tour was a marvellous education for Faraday, who returned as an experienced chemist who had met many of the leading chemists of Europe.

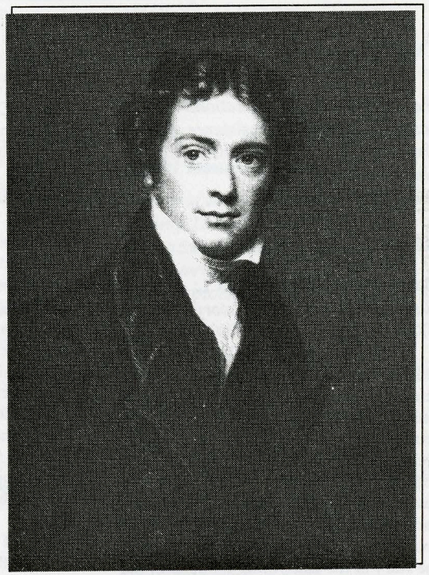
Planning is now underway in the United Kingdom to mark the bicentenary of Faraday's birth on 22 September 1791. A few preliminary highlights of Faraday bicentenary projects will give an idea of the scope of activities in store.

Several relevant publications are in preparation. Faraday kept a journal of his travels; the manuscript is in the Archives of the Institution of Electrical Engineers (IEE). Though extracts have been published in biographies, the full text, together with letters Faraday wrote while in Europe, will be published for the first time next year as *Curiosity Perfectly Satisfyed: Faraday's Travels in Europe, 1813-1814*, edited by Brian Bowers and Lenore Symons. Also, a complete edition of Faraday's letters is being prepared by Frank A.J.L. James. Volume One (letters up to the end of 1831) will be published by the bicentenary. A volume of *Faraday's Chemical Notes*, also in the IEE Archives, is being prepared by Ryan Tweeney and David Gooding. These books are being published by Peter Peregrinus Ltd. for the Institution of Electrical Engineers. A new biography by Frank James, David Gooding, and Geoffrey Cantor is to be published by Macmillan.

There will be a special exhibition at the Science Museum, London, and a short biography to accompany that written by Brian Bowers. The core of the exhibition will be a chronological account of Faraday's life and work. Sections branching out at appropriate points will discuss the contemporary background, where that is desirable to help the modern visitor understand Faraday's work, and the developments that have arisen from his work.

The bicentenary day is Sunday, 22 September 1991. A Thanksgiving service is to be held in Westminster Abbey on the 20th. That raises the interesting point that Faraday, a devout Christian but a member of the small Sandemanian Church, would not himself have attended a service in the Abbey or in any church building belonging to a denomination other than his own.

On the three days following the bicentenary, there will be a series of linked meetings featuring eminent speakers. The Royal Institution will host the symposium scheduled for the 23rd. A program organized by the Institute of Physics will be held at the Science Museum on the 24th. The final forum will be on the 25th at the Institution of Electrical Engineers.



Michael Faraday. In 1931, Lord Rutherford wrote, "The more we study the work of Faraday with the perspective of time, the more we are impressed by his unrivalled genius as an experimenter and natural philosopher. When we consider the magnitude and extent of his discoveries and their influence on the progress of science and industry, there is no honor too great to pay to the memory of Michael Faraday..."

The government also plans to honor Faraday. The Post Office will issue a commemorative stamp, and Faraday's portrait will appear on a new design of £20 note.

A number of other functions are being discussed; further details will be available in due course from the various bodies concerned. For more information, contact Brian Bowers, Science Museum, London SW7 2DD, United Kingdom.

Brian Bowers is the Curator of Electrical Engineering at the Science Museum.

New Publications . . .

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

Books

Martin Campbell-Kelly. *ICL: A Business and Technical History*. Oxford, UK: Clarendon Press, 1989. 320 pp.

This book is the official history of ICL, the principal computer manufacturer in the United Kingdom. ICL is largely the product of the British government, which orchestrated a series of mergers and acquisitions in an effort (occasionally successful) to promote business efficiency and keep one of its key industries competitive. The story of ICL is thus also the story of the computing interests of the British Tabulating Machine Co. (BTM), Powers-Samas, GEC, EMI, Ferranti, English Electric, LEO, Marconi, and Elliott-Automation — in effect a history of the British computing industry.

The first part of the book covers the long history of punched-card tabulation in the UK, from the incorporation of BTM in 1907 through the 1940s. In the 1940s, Britain became one of the technical leaders in electronic computers — originally ahead of the United States — and many companies, including several of the punched-card tabulating machine companies, began manufacturing computers in the 1950s. Beginning in 1959, there was a massive shakeout of this industry, leading eventually to the formation of ICL in 1968. Campbell-Kelly traces ICL's history into the early 1980s.

This is not merely the story of the British computer industry. Through licensing arrangements, subsidiaries, and direct sales, foreign companies — in particular, IBM — have played a major role in the development of the British industry. This work is better seen, then, as part of the story of multinational, high-technology business competition. The book also is not limited to business developments. There is an effective blend of business and technology, whose accounts inform one another. The author's access to the records and personnel of the company, as well as his broad knowledge of the history of computing, show in the able analysis.

Martin Campbell-Kelly is a Lecturer in the Department of Computer Science at the University of Warwick in Coventry.

I. Bernard Cohen. *Benjamin Franklin's Science*. Cambridge, MA: Harvard University Press, 1990. 273 pp.

This volume pulls together a lifetime of essays written by Cohen on Franklin's science and inventions, completed by three new essays. The older essays have been modified slightly to accommodate more recent scholarship by John Heilbron, Roderick Home, and others. One chapter, on the introduction of the lightning rod in Europe, is coauthored by Robert Schofield, and a supplement, by Samuel Edgerton, covers the Franklin stove.

Much of the book is devoted to Franklin's one-fluid theory of electricity and his sentry box and kite experiments intended to prove the presence of large electrical forces in the atmosphere. Professor Cohen argues at considerable length that Franklin's research was undertaken originally for its intrinsic scientific merit, but that Franklin was not averse to practical applications of his discoveries. This discussion provides the context for his account of the development and dissemination of the lightning rod. Other chapters cover Franklin's theory of heat and color, his printing practice, and his general promotion of international science.

I. Bernard Cohen is the Victor S. Thomas Professor Emeritus of the History of Science at Harvard University.

Other Recent Books

Beltran, Alain, and Pascal Griset. *Histoire des Techniques aux XIX^e^ et XX^e^ Siècles*. Paris: Armand Colin, 1990. 190 pp.

Cahan, David. *The Physikalisch-Technische Reichsanstalt, 1871-1918*. New York: Cambridge University Press, 1989. 315 pp.

Cardwell, Donald S.L. *James Joule: A Biography*. Manchester, UK: Manchester University Press, 1989. 333 pp.

Hendry, John. *Innovating for Failure: Government Policy and the Early British Computer Industry*. Cambridge, MA: MIT Press, 1989. 240 pp.

Lipartito, Kenneth. *The Bell System and Regional Business: The Telephone in the South, 1877-1920*. Baltimore: Johns Hopkins University Press, 1989. 283 pp.

Masani, P.R. *Norbert Wiener 1894-1964*. Basel: Birkhäuser Verlag, 1990. 416 pp.

Rees, D.W.E. *Satellite Communications: The First Quarter Century of Service*. New York: John Wiley and Sons, 1990. 329 pp.

Articles

Baum, Dwight C. "[Letter to the Editor:] Better Bombsights." *IEEE Spectrum* 27, no. 3 (March 1990): 16.

Ben-Chaim, Michael. "Social Mobility and Scientific Change: Stephen Gray's Contribution to Electrical Research." *British Journal of the History of Science* 22 (1990): 3-24.

Bowden, Sue. "Credit Facilities and the Growth of Consumer Demand for Electric Appliances in the 1930s." *Business History* 32, no. 1 (Jan. 1990): 52-75.

Cantor, Geoffrey. "Why Was Faraday Excluded from the Sandemanians in 1844?" *British Journal of the History of Science* 22, part 4, no. 75 (1989): 433-437.

Cullen, A.L. "Henry Booker and the Impedance Concept." *Journal of Atmospheric and Terrestrial Physics* 51, nos. 9/10 (Sept./Oct. 1989): 829-830.

D'Agostino, S. "Pourquoi Hertz et non pas Maxwell, a-t-il découvert les ondes électriques?" *Centaurus* 32 (1989): 66-76.

Ecenbarger, William. "[Photocopier Inventor Chester Carlson:] Copy Cat." *The Rotarian* 156, no. 2 (Feb. 1990): 16-17, 58.

Fink, Karl J. "Johann Krüger on Electricity: 'Cui Bono,' For Whom to What Good?" *Electric Quarterly* (of The Bakken) 12, no. 1 (Winter 1990): 2-3.

Fullinwider, S.P. "Hermann von Helmholtz: The Problem of Dantian Influence." *Studies in History and Philosophy of Science* 21, no. 1 (1990): 41-55.

Gooday, Graeme. "Precision Measurement and the Genesis of Physics Teaching Laboratories in Victorian Britain." *British Journal of the History of Science* 23 (1990): 25-51.

"History of Auditory Physiology at RLE [MIT Research Laboratory of Electronics]." *RLE Currents* 3, no. 1 (Dec. 1989): 14-15.

Kingsley, F.A. "[Letter to the Editor:] Radar Reminiscences." *IEE Review* 35, no. 8 (Sept. 1989): 296.

Kracheel, Kurt, and Ulrike Gierlinger. "Wenn der Groschen fällt [Münzautomaten im Deutschen Museum]." *Kultur und Technik* 13, no. 2 (1989): 98-105.

_____, and Adalbert Kukan. "Der Weg zum Autopilot: 60 Jahre Flugregler-Systeme." *Kultur und Technik* 13, no. 2 (1989): 120-125.

Langacker, Paul, and Alfred K. Mann. "The Unification of Electro-magnetism with the Weak Force." *Physics Today* 42, no. 12 (Dec. 1989): 22-31.

Mayes, Victor. "[Letter to the Editor:] SI and the Typewriter [and the Symbol for 'Ohm']." *IEE Review* 36, no. 2 (Feb. 1990): 48.

Meltzer, Irv. "[Letter to the Editor:] Better Bombsights." *IEEE Spectrum* 27, no. 3 (March 1990): 16.

Müller, Arnold H. "35 Jahre Halbleitertechnik in der Schweiz." *AGEN Mitteilungen*, no. 50 (Nov. 1989): 53-63.

Nichols, B. "Radio Propagation Studies at Cornell in the Forties and Fifties." *Journal of Atmospheric and Terrestrial Physics* 51, nos. 9/10 (Sept./Oct. 1989): 831-836.

Pais, Abraham. "George Uhlenbeck and the Discovery of Electron Spin." *Physics Today* 42, no. 12 (Dec. 1989): 34-40.

Perry, Tekla S. "[Amr Moshen:] He Builds Tools for Designers." *IEEE Spectrum* 27, no. 5 (May 1990): 44-45.

Phillips, Melba. "The American Physical Society: A Survey of its First 50 Years." *American Journal of Physics* 58, no. 3 (March 1990): 219-225.

Post, Robert C. "A Few Words about this Picture [of the Demolition of Los Angeles's Cable Railway]." *American Heritage of Invention and Technology* 5, no. 3 (Winter 1990): 30-31.

Rabinowitz, Mario. "Falling Bodies: The Obvious, the Subtle, and the Wrong." *IEEE Power Engineering Review* 10, no. 4 (April 1990): 27-31.

Shiryaev, A.N. "Andrei Nikolaevich Kolmogorov: In Memoriam." *Teoriya Veroyatnostei i ee Primeneniya* (Theory of Probability and Its Applications) 34, no. 1 (March 1989): 1-99.

Sinai, Ya. G., and A.N. Shiryaev. "The Fiftieth Anniversary of the Creation of the Probability Theory Department of the Mechanics and Mathematics Faculty of Moscow University, Founded by A.N. Kolmogorov." *Teoriya Veroyatnostei i ee Primeneniya* (Theory of Probability and Its Applications) 34, no. 1 (March 1989): 164.

Strothman, James E. "The Ancient History of [IBM] System/360." *American Heritage of Invention and Technology* 5, no. 3 (Winter 1990): 34-40.

Teichmann, Jürgen. "Mit Röntgen-augen in eine neue Welt: Die 40jährige Geschichte der Röntgen-astronomie." *Kultur und Technik* 13, no. 2 (1989): 87-89.

"Television Receivers." *Philips Technical Review* 44, nos. 11/12 (Nov. 1989): 334.

Trümper, Joachim. "Die Entdeckung der Röntgenastronomie in Deutschland." *Kultur und Technik* 13, no. 2 (1989): 90-95.

Vakhaniya, N.N. "A.N. Kolmogorov and the Evolution of the Theory of Probability Distributions in Linear Spaces." *Teoriya Veroyatnostei i ee Primeneniya* (Theory of Probability and Its Applications) 34, no. 1 (March 1989): 170-173.

Whitehead, Edwin C. "The Retrospectroscope: The Story of Technicon's SMA 12/60." *IEEE Engineering in Medicine and Biology Magazine* 9, no. 1 (March 1990): 91-93.

Yamamoto, Mitsuyoshi. "Electrical Machines in the 19th Century." *Denki Gakkai Zasshi* [Journal of the Institute of Electrical Engineers of Japan] 110, no. 1 (Jan. 1990): 47-50.

Special Issues

Bulletin of the London Mathematical Society 22 (1990). A special memorial-tribute issue for Andrei Nikolaevich Kolmogorov (1903-1987), a pioneer in electrical filtering theory.

IEE Proceedings 136, part A, no. 6 (Nov. 1989). This special issue on the history of electrical engineering includes the following articles.

Bowers, B. "Alexander Trotter—A Well-Connected Electrician," 337-340.

Burns, R.W. "Aspects of UK Air Defence from 1914 to 1935: Some Unpublished Admiralty Contributions," 267-278.

Duffy, M.C. "Mainline Electrification and Locomotive-Electric Systems," 279-289.

Hempstead, C.A. "The Early Years of Oceanic Telegraphy: Technology, Science and Politics," 297-305.

Lynch, A.C. "Silvanus Thompson: Teacher, Researcher, Historian," 306-312.

Philips, V.J. "Without the Valve: Some Alternatives to Thermionic Devices," 313-320.

Ramsbottom, C.E., and A.J. Ramsbottom. "Development of the Electric Organ and the Significance of the Contributions of Robert Hope-Jones, MIEE," 321-329.

Symons, E.D.P. "The Photographic Archive of the British Thomson-Houston Company," 330-336.

Woodward, G. "Staite and Petrie: Pioneers of Electric Lighting," 290-296.

IEEE Transactions on Electrical Insulation 25, no. 1 (Feb. 1990). An issue on the history of the IEEE Dielectrics and Electrical Insulation Society, with profiles of members, publications, conferences, and committees.

From page 1 . . .

professor of physics at the University of Sydney, from 1886-98, Threlfall was influential in developing the first courses in electrical engineering in Australia. He also served as a consultant to electrification projects in several of Australia's major cities. The microfilming of Threlfall's letters, coordinated by Prof. R.W. Home, University of Melbourne, made this important but fragile material accessible to scholars.

Electrical Engineering Milestones

In 1983, the Center established the Electrical Engineering Milestones program to recognize important accomplishments in electrical and electronics technology. In this way, the IEEE hopes to increase the understanding of electrical history among engineers and the public, and to encourage the preservation of the historical record of these achievements. To date, nearly 20 Milestones have been approved at the international, national, and regional levels. Representatives from the IEEE, government, and industry participate in the public dedication ceremonies, which are covered by local press, the IEEE *Institute*, and the Center's *Newsletter*.

The Center's Staff

Robert Friedel was the Center's first director and guided it through its formative years. The slate of programs discussed above was designed by Friedel, with advice and support from the IEEE History Committee and Executive Office. He was assisted in those first years by **Nancy Perlman**, who served as the archivist from 1981-82. Perlman was responsible for hunting down the disparate caches of the Institute's archives and consolidating the records at the Center.

At the start of 1983, **Robert Casey** joined the staff as assistant historian and **Joyce E. Bedi** came on board as curator. The team of Friedel, Casey, and Bedi was responsible for a number of historical projects for the IEEE Centennial in 1984, ranging from a history guide for IEEE Sections, to a timeline poster, to the exhibit, *A Century of Electricals*, to a slide show on the history of electrical engineering. Though Friedel and Casey left the Center during 1984, Bedi continued as curator until the present (see page 7), also serving as acting director during 1988-89.

Ronald Kline succeeded Friedel as director from 1984-87 and **Anne Benson** joined the staff as research assistant from 1984-85. It was under Kline that the Electrical Engineering Milestones program began to flourish. With research assistant **Suzan Walworth**, Kline and Bedi developed the *IEEE Electrical Engineering Milestones Manual* (1986) for use by IEEE Sections. Kline also emphasized the Center's role as a resource to scholars and gave high priority to such projects as a survey of the Wheeler Gift collection of historical electrical literature, the compilation of *Recent Titles in Electrical History*, and the Survey of Archives and Manuscript Collections Relating to Electrical Science and Technology (SAMCREST). Started by Friedel in 1981, the results of SAMCREST were published in Volume 1 of the *Sources* series.

In 1985, the Center's participation in Northeastern University's Cooperative Education Program began. Undergraduate students in history and the humanities served as research assistants at the Center from 1985-89. Foremost among these was **Craig Semsel**, who was responsible for much of the editing and verification of data for Volumes 1 and 2 of the *Sources* series. **Kathleen Hart, Gary Krampf, Donnette Soares, Debra Braskett, Lloyd Battle, and William Goffredo** also spent co-op terms at the Center.

Through the generosity of the IEEE Life Members, the Center has employed graduate students since 1981 as summer interns working on special projects. **George Sell, David Rhees, Bruce Hevly, Thomas Lindblom, Edward Sowders**, and Craig Semsel have held internships.

A year ago, **William Aspray** was appointed as director to take the Center into its next decade. He has been assisted by **Charles Dwight**, the Center's research assistant, who resigned recently. Dwight completed the editing of Volume 2 of *Sources* and handled the Center's reference service.

One of Aspray's main concerns during his first year has been the negotiation of an agreement between the IEEE and Rutgers University for joint sponsorship of the Center. In anticipation of approval of that agreement, which includes an increased level of staffing, Aspray has made a number of appointments.

- **Joseph N. Tatarewicz** has been named associate director and curator. In addition to carrying out historical research, he will manage the archives and public outreach programs.
- **Frederik Nebeker** will fill the new position of research historian. His duties will include historical research and managing the Milestones and biographical programs.
- **Eric Schatzberg** has been appointed postdoctoral fellow, a new position supported by Rutgers University. He will divide his time between teaching and conducting research on the history of electrical engineering.
- **Andrew Goldstein** is the Center's research assistant. He is responsible for providing research support for all the Center's programs and will provide most of the reference assistance.
- **Diane Sommerville** will serve as the Center's graduate assistant, a new position supported by Rutgers University. Her duties will be to provide research assistance on all Center programs.

The first decade at the Center for the History of Electrical Engineering has been an active and fulfilling one; the second decade promises to continue this trend. Through its programs, the Center hopes to bring the heritage of electrical engineering to a broad range of people. As both a collector and disseminator of information, the Center is an important resource for those interested in the electrical world.

Bedi Resigns

Joyce E. Bedi, curator at the Center for the History of Electrical Engineering since 1983, as well as acting director during 1988-89, will resign at the end of July. She has been awarded a Hagley Fellowship and will enter the Ph.D. program in the history of technology at the University of Delaware.

Much of Bedi's work at the Center has been with the exhibits, publications, and collections programs. She was part of the development teams for *A Century of Electricals* and *The Laser at 25*, co-curated *Edison after the Electric Light: The Challenge of Success* with Bernard S. Finn, curated *From Inventor to Scientist: Elihu Thomson, 1885-1910*, and is working on *Through a Glass Brightly: A History of Television in America*. She also prepared small, changing exhibits at the United Engineering Center. Bedi has served as editor and designer of this *Newsletter* and all of the Center's other publications since 1984. She has built the Center's photograph collection from approximately 2,000 to 15,000 images and has a guide to the collection in preparation. She also ran the Center's photo reference and reproduction service.

Meetings . . .

Interelectric '91

To commemorate the centennial of the first three-phase alternating-current transmission from Lauffen to Frankfurt am Main, the Institute of Economic History at the DDR Academy of Sciences will hold "Interelectric '91." This international symposium will provide a forum for a discussion of the historical background as well as the present-day problems of the power-producing industry worldwide. The conference will be held during 18-22 March 1991 at the Eyba Castle near Saalfeld. For more information, contact Gerd Henniger, Institut für Wirtschaftsgeschichte der Akademie der Wissenschaften der DDR, Prenzlauer Promenade 149-154, Berlin 1100, Federal Republic of Germany.

International Conference on Technological Development

The Dept. for Engineering Sciences, Innovation and Society at the University of Technology in Eindhoven, The Netherlands, is sponsoring an international conference on "Technological Development and Science in the 19th and 20th Century." The conference will bring together historians and philosophers of science and technology to discuss the interaction between science and technology in the last two centuries. Scheduled session topics include "The Interaction between Science and Technology: Historical and Philosophical Aspects," "The Nature of Technological Knowledge," "Engineering Profession and Technological Development," and "Science and Technology: New Perspectives." The conference will be held during 6-9 November 1990 at the University of Technology in Eindhoven. For details, contact Peter Kroes, Faculty of Philosophy and Social Sciences, University of Technology Eindhoven, P.O. Box 513, 5600 MB Eindhoven, The Netherlands.

Technohistory of Electrical Information

A Technology Workshop on the Technohistory of Electrical Information will be held at the Deutsches Museum in Munich on 15-19 December 1990. Sessions devoted to the technological history of telegraphs and telephones; audio, video, and radio; and computers, as well as to works-in-progress, are planned. For details, contact Oskar Blumtritt or Hartmut Petzold, Deutsches Museum, Postfach 260102, 8000 Munich 26, Federal Republic of Germany (089-21-79-1, ext. 271).

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 have not already done so, please complete the form below and return it to the Center to be certain of receiving future issues.

Name _____

Address _____

_____

_____

IEEE Membership No. (if applicable) _____

Please send information on becoming a Friend of the Center _____

Exhibitions and Museums . . .

Whence and Whither the Information Age?

Bernard S. Finn

In May, the Smithsonian's National Museum of American History opened *Information Age: People, Information & Technology*, a major permanent exhibition. In this show, the Information Age is defined as a confluence of immediate (electrical) communications with immediate (electrical) processing. Though this definition prohibits any detailed discussion of the importance of books, newspapers, and movies, it does allow the exhibit to be a little more focussed in dealing with what is admittedly a very big subject. It is hardly surprising, therefore, to find that in the beginning there was the telegraph, and a hundred years later there was the electronic digital computer. Spurred by a post-war environment that was influenced by enormous government expenditures, these two technologies gradually merged (and continue to merge) and gradually assumed a larger and larger influence over American life. And there was and is the Information Age.

Such is the central theme of the exhibit. Secondary themes include (a) attempts to show that technology not only affects society, it is a product of social circumstances; (b) examples of information machines, where it can be seen that they all deal with one or more of the fundamental elements of coding, decoding, storage, communications, and processing; and (c) sequences to illustrate how social influences take time and are dependent especially on who has access to information and who exercises control.

The exhibit uses many tools to illustrate these themes. Among the hundreds of artifacts displayed are Morse's telegraph, Sheutz's analyzer, William Gray's pay telephone, a Hollerith tabulator, ENIAC, a Carterphone, an IBM 360, bugs from Watergate, and the first Apple computer. As examples of the social-origins-of-invention theme, the show includes comparisons of the Morse-Vail and Cooke-Wheatstone telegraphs, of the Gray and the Bell harmonic telegraph and telephone experiments, and of field-sequential and dot-sequential television.

Visitors also encounter excerpts from period films, both humorous and didactic; a few places where they can scan an individually-assigned bar code so that information can be recorded for later retrieval; and "interactive" stations—ranging from telegraph keys to computer keyboards. The most suggestive, perhaps, is where their fingerprints can be recorded electronically and stored for later retrieval, hopefully raising questions about where information goes and who controls it.

By Smithsonian standards, this is a large exhibit, occupying 14,000 square feet (including a final theater). Its gestation period was about five years and involved a team of curators headed by David Allison and including Jon Eklund, Bernard Finn, Steven Lubar, and Uta Merzbach. *Information Age* was designed by Rogow + Bernstein and received substantial assistance from corporations associated with the information industry. The National Museum of American History of the Smithsonian Institution is located at 14th Street and Constitution Avenue, N.W., Washington, DC 20560 (202-357-2700). The Museum is open daily from 10 a.m. to 5.30 p.m.

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