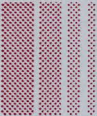

Center for the History of Electrical Engineering

Newsletter No. 25 Fall 1990



Center Moves to Rutgers



Rutgers, the State University of New Jersey, College Avenue Campus, new location for the Center for the History of Electrical Engineering

We are delighted to report that in August 1990, the IEEE signed a contract with Rutgers, The State University of New Jersey, to carry out coordinated programs in the history of electrical engineering. In September, the IEEE Center for the History of Electrical Engineering was moved from IEEE headquarters in New York to the Rutgers campus in New Brunswick, where it joined a newly formed Rutgers Center for the History of Electrical Engineering. The two will be housed together, will coordinate all of their operations, and will generally refer to their joint effort as the Center for the History of Electrical Engineering. The director of the IEEE Center will serve as the director of the Rutgers Center.

For several years, the IEEE History Committee had considered a relocation of the IEEE Center to a university. The cost of New York real estate made it

impractical to provide all the space needed for archives to be stored, exhibits to be prepared, engineers and historians to visit the center for extended periods of research, and the Center to increase its staff. Because universities offer access to other engineers and historians working on similar projects, good libraries and research facilities, a ready supply of trained inexpensive help in the form of graduate students, and the opportunity to spread our historical message in the classroom, many believed that a university would be a favorable environment for operation of the Center.

There was also a question of expansion. A consultant's report, prepared by Dr. Terry Reynolds of Michigan Technological University, indicated that the IEEE Center had two mutually supportive, but independent missions — service and research — and that it could not do both

adequately with the staff, financial resources, or space available at the time. However, the History Committee and IEEE management regarded both of these missions as important. A move to a university was seen as an optimal solution to these staffing, financial, and space problems.

In order to maintain a high level of service to IEEE members and staff, it was decided that the Center should be relocated near an IEEE facility. A set of criteria for selecting a university home was drawn up, and every research university in the New York-New Jersey-Connecticut area meeting these criteria was contacted. The search quickly narrowed down to Rutgers, which had strong programs in history and electrical engineering, a major research library, the Thomas Edison Papers Historical Project, a keen interest in a cooperative arrangement with IEEE, and close proximity to the IEEE Service Center in Piscataway, New Jersey.

The renewable contract between IEEE and Rutgers is for an initial period of five years. During this time, Rutgers will provide space together for all staff of the Rutgers and IEEE Centers (below simply referred to jointly as the "Center"), including maintenance, utilities, and furnishings. Rutgers will also provide a postdoctoral fellow, one or two graduate assistants, an operating stipend, and access to all Rutgers facilities. IEEE will provide five staff positions (director, curator, research historian, research assistant, and secretary), space for the IEEE archives at the IEEE Service Center, the capital budget, and most of the operating budget. This represents a tripling in the staff size and almost as large an increase in the budget, with only a 30% increase in the cost to IEEE. These changes should make it possible for the Center to carry out a much more active and varied program serving electrical engineers, historians, and the general public.■

New Offices of
the Center
for the History
of Electrical
Engineering.
In January 1991
All Center staff,
reference collections,
and research
and administration
will be located
at the
39 Union Street
offices



About Rutgers

Rutgers was chartered in 1766 and is today one of the nation's largest state university systems. It has an international reputation for its research and is known for maintaining high standards,

diversity, excellent academic resources, and a full complement of research, seminar, and cultural activities. The New Brunswick campus is located within walking distance of the railroad station, with frequent service to New York City, Philadelphia, and Washington.

Rutgers possesses one of the nation's front-ranked history departments, judged recently by outside reviewers as among the top twelve in the country in both overall quality and publication productivity. The department's faculty numbers fifty and is able to offer a full range of courses, with particular strengths in American and European social, economic, and cultural history, and in women's history. Eleven members of the history department and another dozen in other departments of the university conduct research on various aspects of the history of technology, medicine, and science.

Similarly, the science and engineering departments are of national distinction. The computer science and electrical engineering departments both offer historical courses, and a number of their faculty members, including Herbert Freeman and David Goodman, are involved in other IEEE activities. Other faculty in programs as diverse as American studies, economics, philosophy, political science, psychology, sociology, management, and microbiology offer courses that include consideration of the history of technology, medicine, and science. There are also campus instructional offerings in oral history, archives management, and museum operation.

Four other internationally known centers located on campus carry out research in the history of technology, medicine, and science. The one most closely connected to IEEE interests is the Thomas A. Edison Papers Project, directed by Reese V. Jenkins. It is a long-term, wide-ranging project to collect, edit, and publish the inventor's works in book and microfiche formats. This research delves into every aspect of nineteenth and early twentieth century electrical history. The Edison Papers Project offers instruction in historical editing, archives management, and museum studies in conjunction with the nearby Edison National Historical Site in West Orange, New Jersey, and other departments and facilities at Rutgers.

Three other centers offer special programs for the research and lively discussion of contemporary and historical issues. The Center for Critical Analysis of Contemporary Culture (George Levine, Director), the Center for Historical Analysis (John Gillis, Director), and the Institute for Health Care Policy and Aging Research (David Mechanic, Director) all attract international groups of visiting scholars and students to study topics related to changing common themes, many of them related to the history of electrical engineering as it is broadly conceived.

A colloquium in the history of technology, medicine, and science provides students and staff with opportunities to meet with scholars in these fields and to hear about recent research. The location of Rutgers in the middle of the northeastern corridor, the site of the heaviest concentration of history of science and technology programs in the United States as well as the site of a large number of major technological businesses with archival holdings, provides many additional opportunities for research and training.

The Rutgers library system, with its holdings of more than three million volumes, ranks among the nation's top twenty-five research libraries. The university library collections are supplemented through cooperative agreements that provide access to the substantial library collections at Princeton and Columbia Universities. Rutgers also belongs to the Research Libraries Information Network, which gives it access to the holdings of the nation's top fifty research libraries.■

Historical Research Program

The Center is interested in all areas of the history of electrical science and technology, in all countries at all periods of time. Our definition of electrical science and technology is a broad one, covering the same technical ground as does the entire group of technical societies of IEEE. Every project we undertake is expected to be technically competent, but we are also concerned about the social, economic, institutional, and political context in which technology is developed and applied.

Products of our historical research vary in their intended audience: engineers, historians, students, educators, the general public, legislators, and other groups. In order to gain a better payoff for our research efforts, we often produce multiple products from one project, such as scholarly articles for the historians, popular articles in IEEE magazines for the engineers, exhibits for the general public, and curricular materials for students.

The magnitude of our mission precludes us from doing all of the research and writing ourselves, therefore many of our activities are designed to promote and sustain research by others. For example, we answer reference requests, place researchers in contact with those having like interests, and publish guides that help researchers locate historical materials. Our own research projects aim to provide models of scholarship and stimulate interest in topics that have not received as much attention as they deserve.

The Center always has several major research projects underway. Current projects or ones in advanced stages of planning include the following:

Computing - The United States came into its leadership position in computing technology in the 1950s and 1960s in large part because of various kinds of stewardship provided by the federal government. The Center is now completing a project, expected to result in a scholarly monograph, on the impact of the National Science Foundation on the development of computing in the United States. This study is the first to analyze

this activity of the NSF, which was one of the most influential government agencies in the advancement of computing.

A second study on computing, currently in the proposal stage, is a popular history of the computer from its earliest origins into the personal computer era. The book aims to explain to engineers, students, and the general public not only the technical advances, but also the social impacts of the new technology and the business and economic environments in which the technology developed. This study will result in the first mass market book covering the entire history of the computer.

Transportation - The Center has recently started a study of the rise and fall of the trolley between 1880 and 1950. The study explores alternative technologies and the choice of the electrical trolley, the complex, functionally integrated systems that arose around the trolley and allowed it to prosper, the social impact of the trolley, and its decline in the face of competition from buses and automobiles. The study will first be reported in scholarly articles intended for urban historians and historians of technology and will later be incorporated in the first book in our series, entitled *Our Electrical World*. These books will examine the social impact and social shaping of electrical technology in various sectors of western society — in this case, the transportation sector.

Bioengineering - We are in the proposal stage for a study of electronic instrumentation and equipment used in biological and medical research and diagnosis. This is an almost entirely neglected subject from a historical perspective, yet the electronic instrumentation and equipment that have been developed have had a major impact on the way in which we conduct medical and biological research and diagnose illness.

Aerospace - Flight into the air and the space environment, while begun with little or no electrotechnology, rapidly became dependent upon electrical and electronic systems. The development of power utilities, instrumentation, flight control, guidance, navigation,

communications, and many other constituents of air and space vehicles is of interest to the Center, no less than the historical interplay of such systems with their ground-based counterparts and the impact of all of this on the society and culture at large. A collaborative study concerning the development of electronic imaging instruments for space astronomy and planetary science is underway, and other studies of aerospace electronics are being planned.

Other topics - Computing, transportation, bioengineering, and aerospace are subjects we have chosen to emphasize because of the lack of good historical coverage. Other subjects, such as the radio, telephone, and power engineering, are receiving considerable attention elsewhere, and for now we are restricting our efforts in these areas to the support and promotion of the work of these other scholars. Subjects of possible future Center historical research projects include microelectronics, radar, home appliances, television, and other consumer electronics.■

*Resuming in
the next issue...*
**New Publications,
news of exhibits,
meetings,
conferences, etc.**

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.

Mailing address:

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IEEE History Committee
1990

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1990

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Joseph N. Tatarewicz, *Associate Director
and Curator*

Frederik Nebeker, *Research Historian*
Eric Schatzberg, *Postdoctoral Fellow*
Andrew Goldstein, *Research Assistant*
Diane Sommerville, *Graduate Assistant*

The Newsletter is made possible by a grant
from the IEEE Foundation.

Public Outreach Program

Public outreach has been one of the strongest aspects of the Center. In its first decade, the Center produced many traveling exhibits and administered the very successful Milestones Program, which designates sites of significance in electrical history. The Milestones Program has been reorganized to identify additional sites, especially outside the U.S., and to enhance its outreach and educational activities.

The exhibit program will continue with a variety of exhibits of various sizes and aimed at various publics. We shall begin with two small exhibits, including one on the IEEE's 100th anniversary, to be mounted at the IEEE headquarters in New York. Our new quarters at Rutgers will give us the opportunity to present some of the Center's activities to visitors and colleagues and to experiment with various presentation techniques. An exhibit on the history of television in

America, on which research began some time ago, has been expanded to give it an international scope and to examine the technological as well as societal aspects of this significant medium. Production of the exhibit should begin late in 1991. In the discussion and conceptual stage is an exhibit on radar, to be prepared in collaboration with leading museums in Europe and North America. The hope is for a major exhibition displaying international and comparative national themes at museums in several different countries.

Because there are many publics to be reached, the Center has begun to pursue other media of public outreach in addition to exhibits and designation of historic sites. The Center already advises on the production of television documentaries, and is aware of the tantalizing opportunities for reaching mass audiences that television provides.

A diversity of other outreach programs are under consideration. Residents and tourists near the sites honored by the Milestones program could be made more

aware of the heritage in their locale through a program of publicity, tour kits for local schools, brochures at the usual highway information racks, engaging AAA and gasoline club publishers of tourbooks to include the sites in their publications, etc. Many local organizations would welcome the appearance of authoritative guest speakers at their functions, if only they could raise the money for expenses. The Center has already initiated a speakers' bureau, and it is hoped it can be expanded and subsidized.

The Center's staff are themselves accomplished teachers and educators, actively teaching in the areas of their expertise. We would like to establish a residence fellowship to allow innovative educators the opportunity to develop new ways of presenting science and technology to various publics, by tapping the historical and educational resources of the center and the technical knowledge and resources of the IEEE. In short, the Center aspires to be at the forefront of education and interpretation in historical science and technology. ■

Sustaining

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Akira Higuchi
David Hodgins
Rochester IEEE Section
Joseph Keithley
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AT&T Matching
John McGrath
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Isaac Auerback
Renato Baculo
Ralph Baer
Thomas Bagg

1990 Friends of the Center
The Friends of the IEEE
Center for the History of Electrical Engineering
further the study and understanding of
electrical engineering's history and impact on
society through support of the Center's programs.
We would like to thank each of you who
contributed to the Friend's Fund of the IEEE
Foundation during 1990.

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(continued on page 8)

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Offices (until approximately 1/15/91):

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College Avenue campus
Rutgers-New Brunswick

Offices (after approximately 1/15/91):

39 Union Street
College Avenue campus
Rutgers-New Brunswick

Archives:

IEEE Service Center
Piscataway, NJ

Telephone (until January 1991):

(201) 932-1066
(after January 1991) (908) 932-1066

Fax (until approximately 1/15/91)

- takes one-day delivery unless we are notified by telephone: (201) 981-0027
After approximately 1/15/91 we will have a fax machine on our premises. The new fax number will be announced in our newsletter and placed on our stationery when it becomes operable.

Electronic Mail: ieee@zodiac.rutgers.edu

Public transit:

Our offices are less than a 10-minute walk from the New Brunswick railroad station. This station is served approximately twice an hour by New Jersey Transit, which operates trains between New York-Penn Station and Trenton Penn Station. The New Brunswick station is also served several times each day by Amtrak trains running between New York and Philadelphia. Twice-an-hour bus service on Suburban Transit's line between New York Port Authority terminal and Princeton, New Jersey, stops in front of the New Brunswick railroad station. Limosine service is available to the Rutgers campus from the Newark International Airport (approximately 25 miles).

IEEE Access:

The Center is only a 15-minute ride from the IEEE Service Center in Piscataway, NJ, and arrangements can be made on short notice for meetings there.

Archives Program

Within the archives at the IEEE Service Center in Piscataway are many valuable resources for the history of electrical technology and science. These include the records of the IEEE and its predecessor societies, The American Institute of Electrical Engineers and the Institute of Radio Engineers. The archives also contain a large photograph collection documenting a wide range of electrical history, a small collection of artifacts closely associated with IEEE, AIEE, or IRE, and several manuscript collections from individuals closely associated with the institution's history.

More than 350 employees work at the IEEE Service Center in Piscataway, New Jersey, minutes from the Rutgers College Avenue Campus. The Archives as well as selected Center collections are housed in a secure area with facilities for visiting researchers.



The materials are safely stored in the IEEE Service Center in Piscataway and a fine start has been made toward organizing and describing them. In the coming decade the Center plans to extend the intellectual control it now has over these resources so that they can be managed properly and made available to a wider community. Initially this means completing a catalog of photographs and visual materials begun earlier this year. Some twelve thousand of the archives' images are now described in a computer database, and thousands more remain to be catalogued.

While completing this first level of description, we shall study the issue of how to make these images available to a wider user community. One option may be videodiscs, which have been used to good advantage by other institutions to provide a visual catalog of images that can be researched anywhere and used in place of slides for lectures. This would permit more efficient searching of the collection, and protect the media themselves from excessive handling. The existing computer database allows one to search for images by name, locale, and topic. We shall study ways of linking this databasa to others containing biographical information, citations to publications and other resources, etc., so that a researcher could easily call up background information concerning the particular image, or call up images related to the information being searched.

Access to the manuscript and other document collections (hundreds of linear feet) needs to be made more convenient. The Center plans to consolidate the existing finding aids and establish a computer database (similar to that used for the images) to provide control and access to the collection. After we have established systems to extend our control over the processed materials., we shall begin processing of the backlog of pending collections and additions.

The reference files and collections of the Center are valuable resources that attract researchers from around the world. The Center has published guides to: manuscript collections, oral history collections, published literature, and artifact collections. Much of the text of these guides already exists in electronic form. Reformatting this data and making it available through the same software tools as the image collection database would facilitate researchers' access to these important materials. Of equal importance, we intend to establish a system to keep these guides up-to-date. Eventually, the Center hopes to widen the locale in which such information can be accessed beyond the Center's offices by making it available on-line, either through existing networks, such as the Research Libraries Information Network or through a dedicated bulletin-board system. In short, we aspire to be at the forefront of research in the history of electrical technology and science—to have a rich, diverse, and easily usable collection of materials and to know where all the other such collections exist and how to gain access to them. ■

New Location - Familiar Faces Getting to Know the Center's Staff

William Aspray, Director,

brings to the Center a decade of experience in historical research, archives management, oral history, bibliography, and research administration, primarily in the areas of history of mathematics and history of computing.

Dr. Aspray received the B.A. and M.A. in mathematics and the B.A. in philosophy from Wesleyan University. He received the M.A. and Ph.D. in history of science from the University of Wisconsin. He also studied at Princeton University and the University of Toronto. Honors include the Philadelphia Science Council Award, American Express Scholarship, and Vilas Fellowship.

Dr. Aspray has written over thirty articles of scholarly and popular history, bibliography, and historiography on mathematics and computing. His edited books include *History and Philosophy of Mathematics* with Philip Kitcher, *Papers of John von Neumann on Computing and Computer Theory* with Arthur Burks, and *Computing Before Computers*. He has also written *John von Neumann and the Origins of Modern Computing*. He is currently preparing a monograph on the impact of the National Science Foundation on computing with Bernard Williams, and a popular history of the computer with Martin Campbell-Kelly.

Before joining the Center, Dr. Aspray was Associate Director and later Acting Director of the Charles Babbage Institute, the Center for the History of Information Processing at the University of Minnesota. Earlier in his career he was Lecturer in History of Science at Harvard University, Assistant Professor of Mathematical Sciences at Williams College, and Acting Director of the Mathematics Extension Department at the University of Wisconsin.

Dr. Aspray is active and has held various positions in the History of Science Society and the Society for the History of

Technology. He is an editor of two series of historical monographs and historical reprints on computing for MIT Press. He is a member of the editorial board of *Annals of the History of Computing* and has served as a consultant to the Smithsonian Institution on their Information Age exhibit and to the American Federation of Information Processing Societies on their historical activities.■

Joseph N. Tatarewicz, Associate Director and Curator,

brings to the Center a decade of experience with historical research, archives, artifacts, oral history, and administration of historical research programs. Until September, 1990 he was Curator in the Department of Space History of the National Air and Space Museum (NASM), Smithsonian Institution. He holds BA and MA degrees in Philosophy (Towson State University, 1972 and the Catholic University of America, 1976) and MA and PhD degrees in History and Philosophy of Science (Indiana University, 1981 and 1984), as well as graduate training in science journalism.

Trained as a historian of science and technology, he has served as NASA History Office Intern, Smithsonian Predoctoral Fellow, and Guggenheim Postdoctoral Fellow at the National Air and Space Museum. He has done extensive archival research in aerospace history, and has conducted numerous oral and video history interviews with astronomers, space scientists, engineers, and administrators. He has worked with the joint NASM-Johns Hopkins University Space Telescope History Project, the Rand Corporation History Project, and on other research activities involving the historical study of large scale government-sponsored engineering enterprises. He is author of numerous scholarly articles in history of science and technology and *Space Technology and Planetary Astronomy*, (Indiana University Press, 1990), and a contributor to Robert W. Smith's *The Space Telescope: A Study of NASA, Science, Technology, and Politics* (Cambridge University Press, 1989), winner of the 1990 History of Science Society's Watson-Davis Prize.

As a curator at NASM, Dr. Tatarewicz was responsible for collecting, conserving, and interpreting artifacts in the National Collection, including spacecraft,

instruments, ground support equipment, and other associated hardware.

As Acting Department Chair, 1986-1987, he was responsible for the overall management of the activities of more than twenty professional and support staff, who constitute the focal point for the space-related research and curatorial activities of the National Air and Space Museum. Dr. Tatarewicz has taught college-level courses in philosophy, logic, ethics, history of science, and history of technology at several universities, and he has also directed graduate level research in the history of science and technology.

Tatarewicz is a member of the History of Science Society, the Society for History of Technology, the Society for Social Studies of Science, the American Historical Association, and is a Full Member of the American Astronomical Society and its Historical Astronomy and Planetary Sciences Divisions.■

Frederik Nebeker, Research Historian,

received B.A. and M.A. degrees in mathematics from, respectively, Pomona College and the University of Wisconsin. He received an M.A. in history of science from the University of Wisconsin and a Ph.D. in the History of Science Program at Princeton University. While at Princeton, he was editor of a major oral-history project, *The Princeton Mathematics Community in the 1930s*, and he worked as instructor in the History Department. Then, as postdoctoral researcher at the American Philosophical Society, he studied materials in the manuscript collections of the APS Library concerning geodesy, cartography, hydrography, meteorology, the study of terrestrial magnetism, and related sciences, and he has completed a bibliographical monograph, *The Geophysical Tradition in 19th-century America*, soon to be published by the APS. Dr. Nebeker has worked also as historian at the Center for History of Physics of the American Institute of Physics, where he carried out research on the history of experimental high-energy physics. His work at the AIP included study of the role of engineering in high-energy physics. He has training in the management and use of science and technology archives, and he has extensive experience conducting oral-history interviews.

(continued on Page 7)

(continued from page 6)

Dr. Nebeker's dissertation was a study of computation in meteorology that focused on the impact of electronic computers on that science. *Calculating the Weather: The 20th-century Transformation of Meteorology*, a revised form of the dissertation soon to be published by Indiana University Press, describes three traditions in meteorology—an empirical tradition of gathering data and of making inferences therefrom, a theoretical tradition of explaining atmospheric motions by means of the laws of physics, and practical tradition of predicting the weather—and explains how electronic digital computers made possible so many connections between the three traditions that they may be said to have merged.

Dr. Nebeker continues to be concerned with the relations between technology and science. He is currently planning a major study of instrumentation in biological and medical research in the period from World War II to the present.■

Eric Schatzberg, Postdoctoral Fellow,

received the B.S. in engineering from Swarthmore and the M.A. and Ph.D. from the University of Pennsylvania in history and sociology of science. He is revising his dissertation, *Ideology and Technical Change: The Choice of Materials in American Aircraft Design Between the World Wars* for publication. Dr. Schatzberg teaches courses in the history of technology and science and is engaged in a research project on the electrification of urban transportation.■

Andrew Goldstein, Research Assistant,

trained in physics and the history of science at Harvard. (B.A. 1988). He is editing the Center's guide to oral history collections in electrical history, oversees reference and information requests, and provides general assistance to Center staff in their research.■

Diane Sommerville, Graduate Assistant,

is a doctoral candidate in the Rutgers Department of History. She assists Center staff in their research.■

Fundraising

The Center is now in a period of rapid expansion. From a staff of two in August 1989, we will have seven people by the end of 1990 and ten by fall 1992. The budget has increased correspondingly. The IEEE continues to provide strong support to the Center, but it is too much to expect any organization to bear the full cost of this expansion. IEEE has increased its funding by 30% and Rutgers is making a major contribution. For the first time, the Center is also receiving support from outside foundations.

As good a base as these sources provide, they are not wholly sufficient. We need the assistance of individuals, companies, and foundations who appreciate all that electrical engineering has contributed to our quality of life over the past century, and who share our belief that history can be applied in the resolution of contemporary problems, such as the lack of students interested in engineering and scientific careers, the unsuitably narrow training being received by today's engineers, and the fear and lack of understanding of technology among the general public.

The Center has established two programs in conjunction with the IEEE Foundation, a non-profit 501(c)(3) organization operating in the State of New York, to allow individuals, companies, and foundations to support the center's activities through financial investments.

Our Partnership Program enables individuals and organizations to become major partners in our operation through financial investments of amounts ranging from \$2500 to \$100,000 and more. For a brochure on the Partnership Program, or for further information, please contact the Center's Director, Dr. William Aspray, or complete the form below.

Our Friends Program enables a wider group of people to become involved through annual support of \$25 as a Regular Friend (\$10 for students, \$15 for retirees) or \$100 as a Sustaining Friend. Friends funds have been used in the past to mount exhibits and publish guides, and in the future they will be used for all aspects of the Center's program. For further information, please complete the form below.■

Name	_____
Address	_____ _____ _____
IEEE Membership No. (if applicable— <i>one need not be an IEEE member to become a Friend</i>)	_____
I would like to receive the Center's newsletter (published three times a year at no charge.)	_____
I would like to receive further information about the Partnership Program.	_____
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Center for the History of Electrical Engineering

(continued from page 4)

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