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# IEEE HISTORY CENTER

THE STATE UNIVERSITY OF NEW JERSEY  
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Preserving, Researching, and Promoting the Legacy of Electrical Engineering and Computing

## STATIC FROM THE DIRECTOR

**A**s the countdown commences to the new millennium (although readers should know that I am personally in the 2001 school), the importance of looking back on the twentieth century — the “electric century” — is growing, and so is the need to use “twenty-first-century technology” to carry out this retrospection. As mentioned last issue, the IEEE History Center will be exploring the concept of an “IEEE Virtual Museum.” I am pleased to announce that the IEEE Foundation has awarded us a grant to hold a workshop to begin this exploration [see page 2]. I am therefore especially pleased to announce that we have completed our long search for an Archivist, and hired Mary Ann Hoffman to be both archivist and “pagemaster” for the Center [see page 2].

Mary Ann arrives not a moment too soon. Many of you may have noticed that the IEEE has just remodeled its Web site. Mary Ann has made sure that our pages weathered the transition smoothly. You will be seeing more and more offerings on our pages ([www.ieee.org/history\\_center](http://www.ieee.org/history_center)) in the months to come, and Mary Ann will also be the point person on our two new Web-based initiatives, the Virtual Museum Workshop named above, and the Sloan project, “History of Technology on the Internet,”

announced last issue.

In the old medium of print, praise has continued to pour in for our Signal Processing History Project. As a result, several IEEE Technical Societies are in discussions with us about doing similar projects with them. Next issue of this newsletter — which will be, by the way, the fiftieth newsletter issued by the Center — should contain a good deal more news.

On the fundraising front, the initiative supported by the IEEE Foundation for the IEEE History Center to raise endowment funds from the IEEE Technical Societies has gotten off to a great start [see box to right]. This issue is our annual opportunity to thank them publicly and also you, our individual donors. It is our individual supporters, through gifts and other actions, who represent the backbone of our program. They provide financial support through giving to the endowment and our operational budget. You will notice a few small changes in the donor acknowledgment section [page 5], as we work to be more fully integrated with the new IEEE Development Office. All donors of \$25 or more now will be listed annually in the newsletter as members of the Friends.

Finally, 1999 sees some changes in our oversight body, the IEEE History Committee [see masthead, page 2]. The term of Chair Emerson Pugh is

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## IEEE TECHNICAL SOCIETIES SUPPORT CENTER ENDOWMENT

As mentioned in the last two issues, the IEEE Foundation, one of the first and foremost supporters of the IEEE History Center's activities, has joined with IEEE to start a Development Office to raise funds proactively for the Foundation and to help the Foundation disburse those funds in support of IEEE's educational and social programs, including its History Center. To that end, the Foundation has urged the Trustees of the IEEE History Center—the Foundation committee responsible for the IEEE History Center—to raise funds first from IEEE entities, in order to demonstrate to the outside world the depth of support for the Center's mission to preserve, research, and promote the legacy of electrical engineering and computing. The IEEE Foundation has therefore offered up to \$1,000,000 in matching funds to match dollar-for-dollar gifts to the Center's endowment from IEEE Technical Societies in 1998 through 2002. The IEEE Life Members Committee, also historically a major supporter of the Center, decided to demonstrate further their support by giving an additional \$100,000 to the endowment.

The Technical Societies have started to be approached, beginning with a presentation to the IEEE Technical Activities Board (TAB) Caucus by Emerson Pugh, 1998 IEEE History Committee Chairman and a member of both the Trustees of the IEEE History Center and the IEEE Foundation Board of Directors. This was followed by a letter to the Society Presidents from Pugh and 1998 IEEE Vice President for TAB Pete Morley. The next phase is to visit, if possible, the board or executive committee of each of the 36 Technical Societies. We are pleased to announce that all six of the Technical Societies so far directly solicited have pledged at a level commensurate with reaching the Foundation's \$1,000,000 challenge!

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### IEEE HISTORY CENTER

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## Staff Notes

### History Center Staff Expertise Widely Sought by Media

*Wireless Magazine*, *Channel 4 (London)*, *NOVA*, NPR, and the St. Louis Science Center have all recently made use of IEEE History Center expertise. *Wireless Magazine* contacted Center Research Historian David Morton for information on major power outages and their effects. An independent documentary film company in London has been consulting with Center post-doc researcher David Hochfelder on the history of the telegraph for a documentary about the Industrial Revolution for *Channel 4 (London)* and *NOVA*. The St. Louis Science Center will be basing monthly exhibits and activities on Rik Nebeker's "This Month In Electrical History" column. National Public Radio's Dan Charles interviewed David Morton in January on the subject of sound recording history. The piece aired nationally on Feb. 12th on NPR's "All Things Considered."

The newsletter reports on the activities of the Center and on new resources and projects in electrical and computer history. It is published three times each year by the IEEE History Center.

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### Nebeker at Historical Electronics Museum

On the evening of 11 November 1998, 80 years to the day after the end of World War I, Center Senior Research Historian Frederik Nebeker delivered a lecture at the Historical Electronics Museum outside Baltimore on the role of the first world war in the establishment of an electronics industry. This was the last in a series of four lectures at the Museum commemorating the discovery of the electron. Nebeker showed how wartime needs — especially the need, in several contexts, for wireless communications — brought about mass production of electron tubes, a proliferation of tube types, and early applications of electronics in control and instrumentation, as well as in communications.

### The Electric Century

Beginning with the January, 1999 issue of the *Proceedings of the IEEE*, David Morton begins a series of articles entitled "The Electric Century," looking back over the last hundred years of the history of electrical, electronic, and computing technologies. The articles touch on some of the most important, interesting, and controversial issues in EE history, and will appear every month through early 2000. One more reason to subscribe to *Proceedings*!

### Reliability Society Oral Histories

Research Historian David Morton

attended the annual meeting of the IEEE Reliability Society January 17th in Washington, D.C. to conduct oral history interviews with three past presidents. The Society was celebrating its 50th anniversary with a special historical presentation at the banquet. Morton interviewed Society co-founder Richard Rollman, President from 1950-52, Victor Wouk, President from 1954-58, and Ray Knight, President from 1973-74.

### History Under Control

The IEEE Control Systems Society (CSS) has an active History Committee, chaired by Linda Bushnell. Most recently, in December 1998, the Committee organized a special session at the Society's annual CDC conference, held this time in Tampa, Florida. The session which featured a distinguished debate over the development of "fuzzy logic," was videotaped and will be archived at the IEEE History Center. Center Director Michael Geselowitz was able to attend part of CDC, including addressing the CSS Member Activities Board and AdCom, and having dinner with the organizers of and participants in the special session.

### Mary Ann Hoffman

Mary Ann Hoffman joined the IEEE History Center in 1998 as its Archivist and Page Master. Before that, she was with the IEEE Regional Activities Department for ten and a half years, where she supported the Regional Activities Board and its committees, including Strategic Planning, GOLD, and Sections Congress. She also provided staff support for the IEEE Life Member Committee. ♦

## Center Activities

### Virtual Museum?

During an IEEE Foundation Retreat last Fall the idea for a virtual museum was proposed. This idea will be considered by the History Center over the next several months. A virtual museum offers the possibility of advancing the public image of the engineer while advancing the educational intentions of IEEE.

The main objectives were defined as:

- Increased awareness and education of the general public about electro-technology
- Recognition of the IEEE as a pre-

mier source of information on electro-technology

- An outreach program for the IEEE History Center

We first plan to bring together a group of



engineers and museum professionals who have insight into this proposed project to discuss the possibilities, opportunities and potential problems.

The first challenge we face is the definition of a virtual museum. So many entities have their own idea of what this is. We hope that the workshop can help us narrow down the issues and come to an agreement on a definition.

The next challenge is the potential cost in numerous areas, including hardware, software, purchasing artifacts to use on the web site, and of course, last but not least is the manpower to accomplish such a task. Also to be determined is the extent of involvement by the History Center.

We will keep you posted on the developments of this proposal in future issues of the Newsletter. ♦

### STEEPLES AND ELECTRICAL TECHNOLOGIES

The lightning rod was the first electrical technology to succeed commercially. It was in 1749, exactly 250 years ago, that Benjamin Franklin installed the first lightning rod (on his own home in Philadelphia). He had discovered a few years earlier that a pointed conductor was especially effective in drawing off an electric charge. Church steeples were, not surprisingly, among the first structures to be equipped with lightning rods. Steeples today are the site also of one of the latest technologies: *Wired Magazine* (February 1999) reports that 300 to 500 steeples in the United States are already serving to house the antennas of wireless companies, and with an expected need for 60,000 new cellular antennas by 2007 this will undoubtedly become much more common. ♦

### MILLENNIUM MINUTE

In its special "20th Century Supplement" of 30 December 1899 (recently reprinted by *Newsday*) the *Brooklyn Daily Eagle* published a collection of interviews and articles with scientists, politicians, artists, and military leaders on their expectations of what the coming century would bring. Among those consulted about the technological changes the Twentieth Century would bring was Ralph W. Pope, then Secretary (later President) of the American Institute of Electrical Engineers. How well did he call the shots? With the century almost over, we can say he did extremely well. Pope's article foresaw suburbanization, telecommuting, television, and something which sounds very much like the world wide web. In understanding the human needs and wants which drove the technologies, Pope understood better than many of his contemporaries how those technologies were likely to develop. Here are some of his predictions.

"The result of real rapid transit, such as electric power will furnish in time, will be to transfer a very large proportion of the overcrowded population to the suburbs."

[On the effects of electric lighting] "...whether the old division of the hours of labor and leisure will not pass away."

"Telephones will be as necessary an equipment of the convenience of guests in a hotel bedroom as a towel rack."

"People will sit down for a chat over the telephone across the ocean as they now do over a cigar across the table."

"One half the business of the world will be done over the wires."

"There are kinds of business...[that] can be wholly transacted without leaving the house."

"With the introduction of a cheap electrical power...the tendency will be quite the reverse, and a return to the operatives doing the work at their own homes."

"Letter writing will become almost a lost art, and it will not be surprising if the majestic Post Office Department should degenerate into a post parcels delivery agency."

"The time is approaching when we shall see, as well as hear, over the wire."

"Under these conditions people of the twentieth are likely to become confined stay-at-homes."

"But it is believed that it will assume another function and that as the disseminator of universal intelligence...there is nothing in the way; nor of the twentieth century man having in his library at home, or his office, an instrument recording the intelligence as soon after the occurrence of the event."

"The twentieth century man need but step the width of his apartment to be fully informed of the events and occurrences of the previous hour in all parts of the world."

"But progress can not be stayed. Delays may be made, but only delays, for efforts against the final accomplishment will be futile." ♦

## Things to See and Do

### Japanese Society for the History of Science and Technology Formed

December, 1997 saw the formation of the Japanese Society for the History of Science and Technology to encourage cooperation of historians, scientists, engineers, policy makers, sociologists, philosophers, economists, museum specialists, archivists, as well as the interested layman. Their journal, *Kagakugijutsushi* will appear twice each year, and looks forward to receiving papers and articles from overseas scholars. Takuji Okamoto, Editor-in-Chief,

Dept. of History & Philosophy of Science, University of Tokyo, 3-8-1 Komaba, Meguro-ku, Tokyo, 153-8902, Japan, cotakuji@mail.komaba.ecc.u-tokyo.ac.jp

### Web Sites of Interest — a random listing of some of our favorites.

Searchable Database of Photos from Niels Bohr Library. More than 1000 photos, 300 of scientists scanned and on-line <http://www.aip.org/history/esva>

History of Science Homepage at U of Oklahoma. Jammed packed with links on everything to do with the history of science and technology. From medieval alchemical manuscripts to the Bologna Astronomical Museum <http://www.ou.edu/cas/hsci/rel-site.htm>

Charles Babbage Institute for the History of Computing. If it could count or click, you can find out about it here: <http://www.cbi.umn.edu>

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Things to See and Do *continued from page 3*

## Conferences

### Space and Place

The Congress of Social Sciences and Humanities will take place on 3-5 June, 1999 at the University of Sherbrooke, Quebec. The congress will address topics in the sociology and anthropology of science, technology and medicine, science and technology policy, science education, environmental studies, women's studies, and cultural studies of science. For more information contact: Gordon McOuat, Contemporary Studies Program, University of King's College, Halifax, NS B3H 2A1, Canada, <http://www.hssfc.ca/>

### The Material Culture of Calculation

The International Laboratory for the History of Science will examine the historical development of ethnomathematics and of abstract arithmetic from proto-arithmetical practices in rural communities to techniques used by ancient, medieval, and early modern administrators and merchants. (Working language of the conference will be English). 19-26 June, 1999, Max Planck Institute, Berlin, Germany.

### Modern Science, Engineering, & the Interpretation of Mankind

1-5 July, 1999 Grudziadz, Poland. Recent developments in the physical and biological sciences, and in engineering, have suggested new concepts and models for inter-

preting the nature of matter, biological systems, brain activity, intelligence, perception, the evolution of language, and the interpretation of symbols. For more information, contact: Miroslaw Kubiak, Technical Schools, ul Hoffmanna 1-7, 86-300 Grudziadz, Poland, fax: 48 56 465 83 83, email: mirek\_k@to.onet.pl

### Science and Cultural Diversity

The XXI International Congress of the History of Science will be held in Mexico City from 8-14 July, 1999. The theme of the congress will be "Science and Cultural Diversity," and papers will be received in French, English, Spanish, Russian, and Portuguese.

For more information, contact the Organizing Committee at; Apartado postal 21-073, 04000 Mexico D. F., MEXICO, email: xxi-ichs@servidor.unam.mx

### Women and Technology

The 1999 International Symposium on Technology and Society (ISTAS '99) Revised date: 29-31 July, 1999, Rutgers University, New Brunswick, NJ, USA. The roles of women in technology are more diverse, controversial, and important today than ever before. The conference will address topics of impact of information on women and women's work; women in the engineering workforce, women faculty and students in science and engineering education; motherhood and technology; historical and current perspectives on women and technological development; technology and gender inequality. For more information, contact: April Brown [april.brown@ee.gatech.edu](mailto:april.brown@ee.gatech.edu) or David Morton [d.morton@ieee.org](mailto:d.morton@ieee.org)

Static *continued from page 1*

over, and he is being replaced by past IEEE President and long-time History Committee member Martha Sloan. I am grateful for Emerson's role in helping to bring me to the History Center and in easing my transition. I am happy that he will continue on the Committee as a regular member. Eric Herz, who has long been involved with the Center in various capacities is leaving the History Committee, as are long-time members James Cortada, Ruth Schwartz Cowan, and Thomas Hughes. They have all contributed to the Center in major ways, and will be missed. They are replaced by Susan Casmira, Amos Joel, David Mindel, and Wallace Read. ♦

Endowment *continued from page 1*

The IEEE Power Engineering Society, which in the past had given \$10,000 to the IEEE History Center endowment, has pledged an additional \$25,000 per year in 1999, 2000, 2001, and 2002, bringing their total commitment to \$110,000. The IEEE Microwave Theory and Techniques Society, which in the past gave \$5,000, has pledged \$100,000 in 1999, for a total of \$105,000. The Solid State Circuits Society has pledged \$50,000 in 1999. The IEEE Signal Processing Society, which in the past gave \$20,000, has pledged \$10,000 in 1999, for a total of \$30,000. The IEEE Magnetics Society, which in the past gave \$5,000, has given an additional \$10,000 for 1998 and has pledged \$5,000 per year in 1999 and 2000, for a total of \$25,000. Finally, The IEEE Electromagnetic Compatibility Society, has pledged \$5,000 per year

### Preservation of the Engineering Heritage

The International Conference on Preservation of the Engineering Heritage — Gdansk Outlook 2000 will be held from 7-10 September, 1999 in Gdansk, Poland. More information is available from <http://www.pg.gda.pl/~pehgo2000/>

### History, Philosophy and Science Teaching Conference

The Alessandro Volta Centre on Lake Como will be hosting the 5th International History, Philosophy and Science Teaching Conference from 15-19 Sept., 1999, which is also the 200th anniversary of Volta's construction of the battery. Papers should address the application of historical, philosophical or sociological considerations to the pedagogical issues in science education, and are due by 1 May. Contact: Dr. Enrico Antonio Gianetto, Dipartimento di Fisica 'A. Volta,' University di Pavia, Via A. Bassi 6, 27100 Pavia, Italy, <http://www.cilea.it/volta99>

### Society for the History of Technology Annual Meeting

SHOT will hold its annual meeting in Detroit, MI on 7-10 October, 1999, and will cover topics related to all aspects of the history of technology. Contact: Dr. Hans Weinberger, SHOT Program Chair, Dept. of History of Science and Technology, Royal Institute of Technology, SE-100 44 Stockholm, Sweden, [hans@tekhist.kth.se](mailto:hans@tekhist.kth.se) ♦

in 1999, 2000, and 2001, for a total of \$15,000. This means that the total of gifts and pledges so far that have been matched or will be matched by the IEEE Foundation as they arrive is \$295,000. Other Societies that had given previously are the IEEE Electron Devices Society (\$25,000), the IEEE Antennas and Propagation Society (\$2,500), and the IEEE Control Systems Society (\$2,000). The direct gifts and pledges from IEEE Technical Societies to date (not including matching funds) therefore total \$364,500. The Trustees will continue to solicit all of the Societies. In the meantime, we apologize to all those Societies that have expressed a desire to participate and have not yet been reached, and even more so to Societies that have made new pledges since this newsletter went to press. ♦

## Donors

*Our sincere thanks to everyone who contributed to the Center to support our 1999 program year or to grow our endowment.*

The Center continues to work hard to preserve and research the legacy of electrical engineering and computing and to spread the word to engineers, students, journalists, decision makers, and the general public. Great progress has been made in achieving financial stability with the establishment of an endowment for the Center. While we are working at further building the endowment, we still depend heavily on operating funds from our two main sponsors, IEEE and Rutgers University, and on project grants and annual contributions from companies, foundations, IEEE entities, and people like you. We need your ongoing support to continue our work on collecting oral histories, publishing technical and popular articles, organizing conferences, designing exhibits, recognizing milestones in electrical and computer history, and working with the media to reach a broader audience. Contributions from individuals sends the clearest possible message to institutional donors that the Center's work is valued by people with an interest in deepening our understanding of the role of electrical and information technologies in shaping today's world.

We have two programs through which individuals and organizations can help support the Center's activities: The Friends Program and the Partnership Program. The Friends Program is for annual gifts of \$25 to \$2499. These gifts, unless otherwise specified, are divided about equally between the endowment and the Center's operating budget, and make the donor a member of the Friends Pro-

gram for the operational year for which the donation is received. The Partnership Program is for one-time pledges of \$2,500 and more, and go directly to the Center's endowment. Partnership pledges can be paid in up to five annual installments, and the donor is a member of the Partnership Program throughout the period when the pledge is being fulfilled or until the completion of the current endowment campaign at the end of 2004, whichever is later.

Whether you give to the Friends Program or the Partnership Program, your gift is tax-deductible in the United States and its use is overseen by the Trustees of the IEEE History Center, a group of distinguished individuals appointed by the IEEE Foundation [see masthead, page 2]. The categories of giving are as follows:

#### Partnership Program

Founding Partner	\$ 500,000 or more
Keystone Partner	100,000 - 499,999
Senior Partner	50,000 - 99,999
Partner	25,000 - 49,999
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Associate	2,500 - 9,999

#### Friends Program

Patron	\$1000 - 2499
Senior Friend	250 - 999
Sustaining Friend	100 - 249
Friend	25 - 99

### Founding Partners

IEEE Incorporated  
IEEE Foundation

### Keystone Partners

IEEE Power Engineering Society  
IEEE Microwave Theory and Techniques Society  
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**Bibliography**

*Gaslights to Gigawatts: A Human History of BC Hydro and its Predecessors* by the BC Hydro Power Pioneers. Vancouver, Hurricane Press, 1998. 256 pp.

Gaslights to Gigawatts is the story of electric power in British Columbia. Electric service began in the region as it did in many North American cities, with the introduction of outdoor arc lights and electric street cars in the 1880s. Following the international pattern, power supply in BC consolidated beginning in the 1890s with the formation of British Columbia Electric. The scale of the new company allowed it to pursue more ambitious technical projects, including the construction of hydroelectric power installations, the first of which it completed in 1898.

The company faced many of the same problems as other power providers in North America serving largely rural areas, including the lack of sufficient demand to achieve true economies of scale, and social pressure to provide household service to a scattered population. BCE in the 'teens and twenties expanded its streetcar service in the cities, expanded into natural gas, and promoted the use of both gas and electric appliances. The BC government in 1945 began acquiring its own generating and distribution facilities as part of a publicly funded rural electrification program. Although the authors gloss this aspect of Canada's electric history, it is interesting to compare the BC experience with the highly controversial, government-run Tennessee Valley Authority project of approximately the same era. Perhaps even more remarkable from an American's perspective was the decision in 1961 to nationalize all of British Columbia's power in order to exploit the region's vast hydroelectric potential, culminating in the impressive Columbia river treaty with the United States.

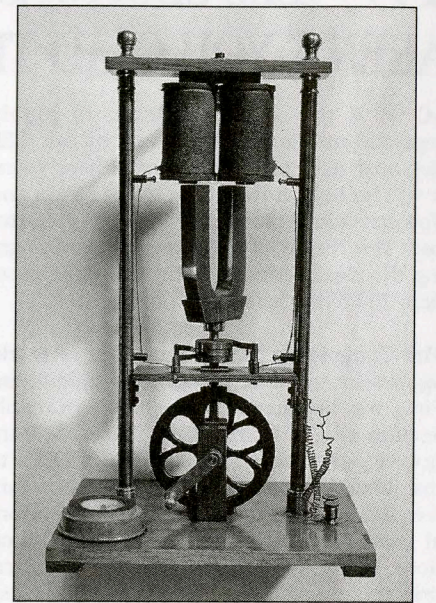
Besides providing a chronology of power development in the province and numerous illustrations, much of the book's appeal is its emphasis on customers and employees of the power companies. Labor strife, the nature

of office work, and maintenance activities, for example, are a major part of the story. The authors also present the darker (so to speak) side of things; the business failures, fatal electrocutions, and natural disasters that punctuate electrical history. Some of them are particularly horrifying, such as the housewife, unfamiliar with electricity, who was killed after using gasoline as a cleaning fluid in an electric washing machine. *Gaslights to Gigawatts* offers readers familiar with academic works such as Thomas Hughes' *Networks of Power* significant variants on the familiar story of electric network-building in the 20th century. Available from Hurricane Press, #406-119 West Pender St., Vancouver, BC V6B 1S5, Canada [www.bchydro.bc.ca/html/about\\_power\\_pioneers.html](http://www.bchydro.bc.ca/html/about_power_pioneers.html)

KEITHLEY, JOSEPH F. *The Story of Electrical and Magnetic Measurements: From 500 B.C. to the 1940s*. New York: IEEE Press, 1999. xv + 240 pp.

Joseph Keithley is the founder of Keithley Instruments, a highly successful company that he started in 1946 to manufacture instruments able to measure extremely low currents and voltages reliably. Keithley's long-standing interest in the history of his field has resulted in this book.

This is as much a story of people as a story of instruments, as Keithley takes a biographical approach, asking such questions as "How did the scientist become interested in the problem to be solved? What did the scientist measure? What tools and instruments did the scientist use?" The book consists of 26 chapters, ordered more or less chronologically. Each covers a topic by looking at the contributions of one person or of a few people. For example, Chapter 3, on the first rotating electrostatic generator, looks at Otto von Guericke, and Chapter 17, on the use of advanced mathematics in measurement, looks at Karl Gauss and Wilhelm Weber. Chapter 24 is the story of Edward Weston and the company he founded in 1888. Most of the book deals with events of the 18th



and 19th centuries; there is little treatment of 20th-century developments.

With portraits of the people discussed, original drawings of instruments, and other graphics, the book is well illustrated. Though the text is not footnoted, each chapter closes with a list of sources and suggested readings.

GLUCKMAN, ALBERT GERARD, *The Invention and Evolution of the Electrotechnology to Transmit Electrical Signals without Wires*, 2nd Edition, Washington, DC: Washington Academy of Sciences, 1996

An annotated bibliography of 17th, 18th, and 19th Century experimental studies, arranged by decades. Major theoretical milestones are remarked upon within the chronology of evolutionary events. Available for \$30.00 from Washington Academy of Sciences, Room 811, 1200 New York Avenue, NW, Washington, DC 20005. ISBN 0-9607222-5-4 ♦

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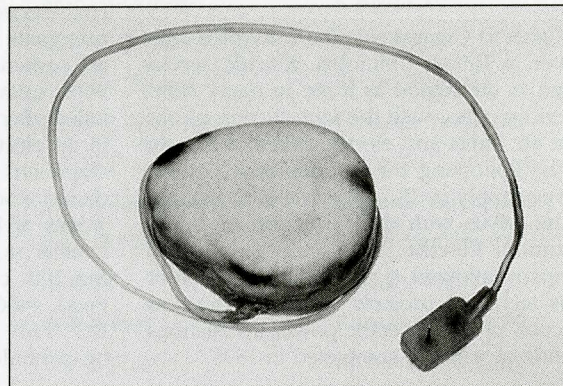
# 1999 IEEE SECTIONS CONGRESS IN THE CITY OF LAKES OR AREN'T YOU GLAD THEY DIDN'T USE THE WORD MILLENNIUM?

SC '99 is the sixth in a series of highly regarded meetings that are held by the IEEE Regional Activities Board every three years. It will be held at the Minneapolis Hilton and Towers, Minneapolis, MN, USA, 8-11 October. The theme of this Congress is Designing the Next Century, and it will draw more than 700 individuals to this conference.

The Congress, which is four days of working sessions and networking, is multi-focus. First, the hundreds of delegates, primarily Section Chairs from all ten Regions, learn how to use the resources of the IEEE to maximize their effectiveness as IEEE volunteer leaders. Workshops, panels and tutorial sessions will be held on Section Operations, Section Activities, and the technical and professional aspects of the IEEE. Second, the Congress is the one major meeting sponsored by the IEEE which brings together the Institute's grass-roots leadership so that they can share ideas, concerns and solutions.

The Congress is also a forum where the Section Chairs speak as the collective voice of IEEE membership, expressing ideas and raising issues about how the Institute can better serve its members, both now and going forward. The issues generated at Section Congresses have had a major impact on the plans made by the IEEE leadership for the future of the Institute.

IEEE will offer numerous exhibits of its products, services, and membership. Over a dozen areas will display IEEE publications, advice on starting a technical conference, professional activities and communication tools, among others. Delegates will also be able to access the membership database as well as the latest on-line products and services.



*Invented in Minneapolis: the Implantable Pacemaker*

The IEEE History Center is planning an exhibit to highlight the numerous activities of the Center. Congress is not only a venue for volunteers to look to the future, it will also give them an opportunity to learn about and appreciate the past. ♦

## Change of Address for Tesla Memorial Society

The new address for the Tesla Memorial Society, Inc. is: 21 Maddaket, Southwyck Village, Scotch Plains, NJ 07076, 732.396.8852



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