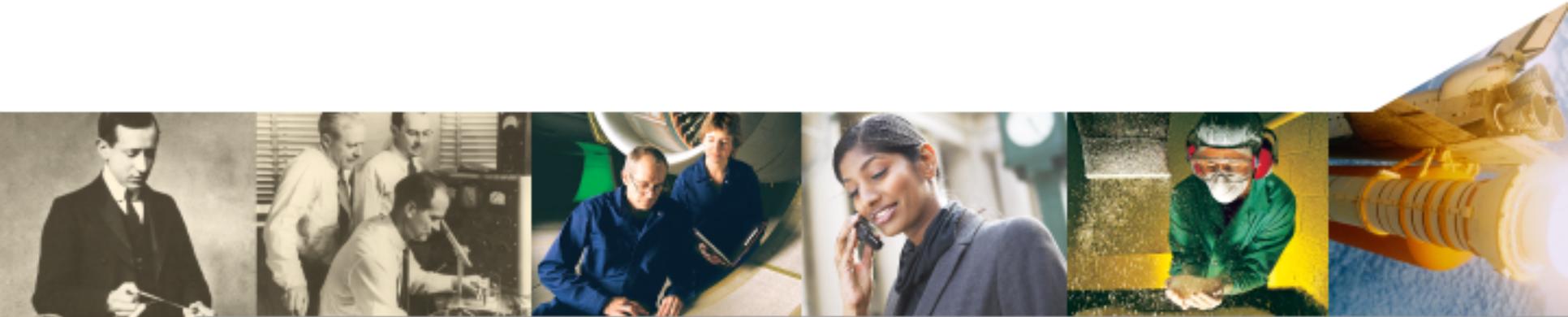


# The History of IEEE and Electrotechnologies

Prepared by the IEEE History Center

IEEE History Center  
39 Union St., New Brunswick NJ 08901  
[ieee-history@ieee.org](mailto:ieee-history@ieee.org)

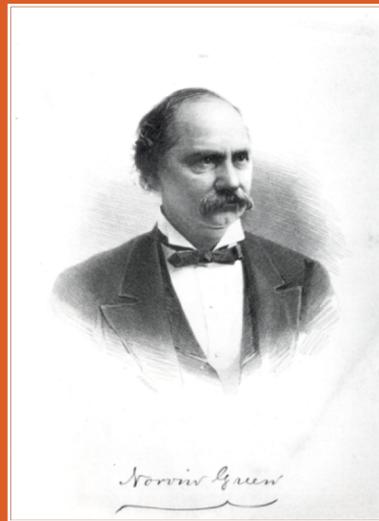


# 1884: The American Institute of Electrical Engineers is founded

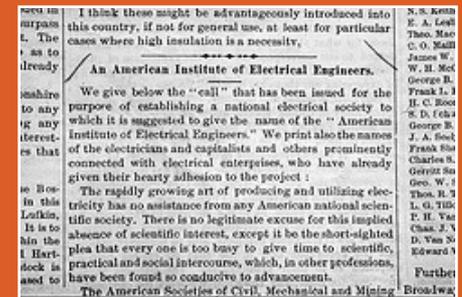
A small group of individuals met in New York and founded the AIEE to advance the new field and represent the US at the 1884 International Electrical Exhibition in Philadelphia. Norvin Green of Western Union became the first president.



Program of the 1884 International Electrical Exhibition, Franklin Institute, Philadelphia



**Norvin Green**, President of Western Union Telegraph and first president of the AIEE



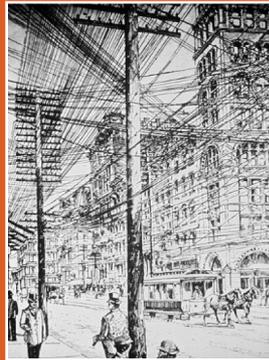
Invitation to the AIEE organizational meeting, Electrical World, 5 April 1884

# Communications: The first important electrical technology

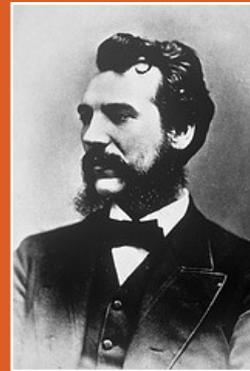
**Samuel Morse's first US telegraph line connected Washington and Baltimore in 1844.** By 1866, a telegraph cable connected the United States and Europe. Alexander Graham Bell followed in 1876 with a telegraph that talked—the telephone.



Franklin Pope,  
telegraph  
operator



Telegraph line  
congestion



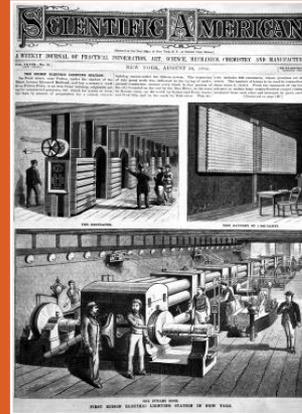
A. G. Bell



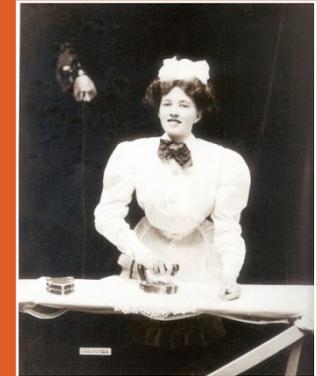
1882  
Telephone set

# A New Industry: Electric Power and Light

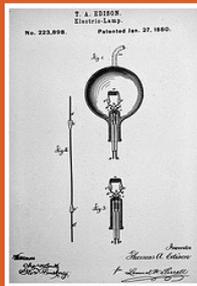
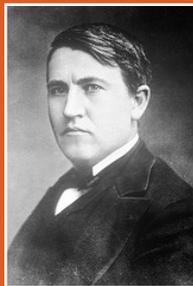
Electric power and light systems arose primarily from Thomas Edison's work. Edison opened his first electric power plant in New York in 1882. Within a decade, electric power had spread to every corner of the globe, with many new applications. The AIEE became dominated by power engineers.



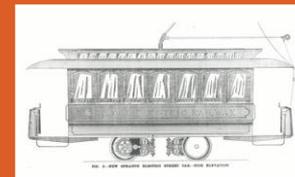
**1882**  
Edison's first commercial plant, Pearl St., NY



**1906**  
Using an electric iron by an electric light



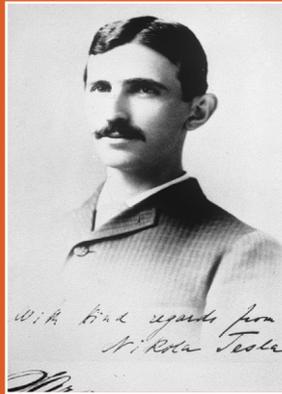
**Thomas Edison** and his incandescent light patent



**Frank Sprague** worked for Edison before leaving to develop the first commercially practical electric streetcar.

# AC vs. DC Power

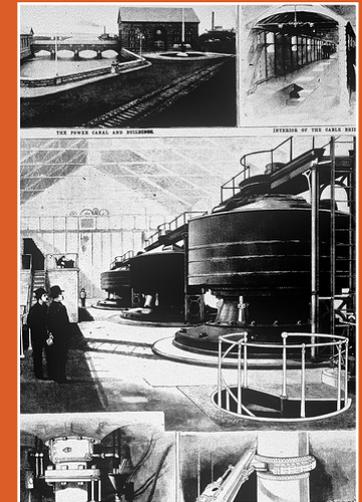
In the 1890s, AC power, championed by George Westinghouse working from inventions by Nikola Tesla, became standard because it could be efficiently transmitted over long distances from massive power plants, such as that built at Niagara Falls, which began sending power to Buffalo in 1896.



**Nikola Tesla,**  
inventor of the  
induction motor and  
a comprehensive  
system for polyphase  
AC power.



**1905**  
Power Generation at Niagara Falls



**1895**  
Niagara Falls Power Plant



THE EDISON ELECTRIC TOWER

# World's Columbian Exposition

Edison's tower of light was a big attraction in Electricity Hall. Ironically, it was Westinghouse that won the bid for powering the fair using 12 of Tesla's two-phase 1000 HP alternators. Edison actively attacked AC technology as being "unsafe" but AC prevailed.

# The Birth of Radio

**Radio, a new electrical technology, arose in the first decade of the twentieth century.** Wireless telegraphy using spark transmitters was the original application, but particularly after the invention of the vacuum tube amplifier, it began to be used to transmit speech and music.



**1901**  
**Guglielmo Marconi** and  
**George Kemp** with  
equipment used in  
transatlantic wireless  
telegraphy



**1912**  
Radio telegraph operators'  
communications with the  
sinking Titanic demonstrated  
the power of radio



**1922**  
Triode vacuum tube  
inventor **Lee de Forest**  
with a radio

# Formation of the IRE, 1912

With the new industry came a new society in 1912, the Institute of Radio Engineers or IRE, modeled on the AIEE, but devoted to radio, and later increasingly to electronics.



IRE logo



**Alfred Goldsmith**  
IRE Co-founder and first  
journal editor



IRE annual banquet, NY, 1915. Among those attending were **Tesla**, **Sarnoff**, **de Forest**, and **Alexanderson**

# Media Becomes Electronic

**In the 1920s, Radio broadcasting swept the world.** Between 1921 and 1930 the number of US households with radios grew from close to zero to almost 14 million. And a still newer technology, television, was moving from experiment to reality. IRE members led the way in these developments.



Vacuum tubes, the first electronic amplifiers, made radio broadcasting and transcontinental telephony possible.



**1921**  
WJZ Studio, Newark NJ



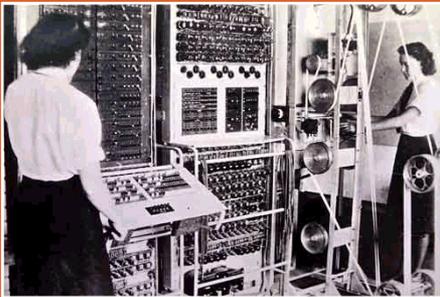
**1930s**  
Listening to radio



**1939**  
RCA President **David Sarnoff** opening commercial TV service, NY

# War and Technological Growth

**Governments throughout the world organized their scientists and engineers to devise technologies for use in World War II.** This not only contributed to the war effort in areas including radar, computing and weaponry, but produced major advances in technologies from electronics to signal processing that would have broad implications for the succeeding years.



Colossus, one of the first electronic computers, was among the machines used at Bletchley Park, England to break the German codes.



Director **Dr. Vannevar Bush** (center), an electrical engineer, and other members of the US Office of Science Research and Development. The OSRD mobilized and directed US R&D during World War II.



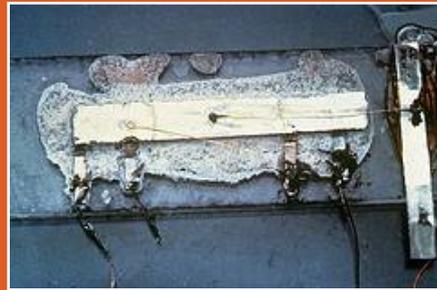
The OSRD established the Radiation Laboratory at MIT to develop radar into an effective technology for use in World War II.

# Solid State Electronics

The transistor and its progeny, the integrated circuit, opened enormous possibilities for new technologies ranging from the iconic portable radio to increasingly powerful computers. Solid state electronics became a hot field in the post war years.



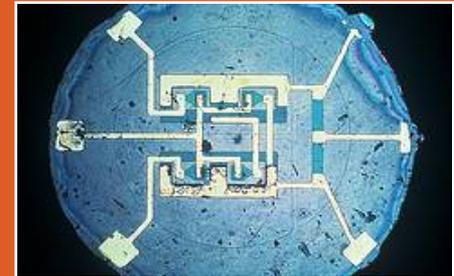
**1947**  
**William Shockley, John Bardeen, and Walter Brattain** invented the transistor, the first solid state amplifier and switch at Bell Labs



**1958**  
**Jack Kilby's** first integrated circuit



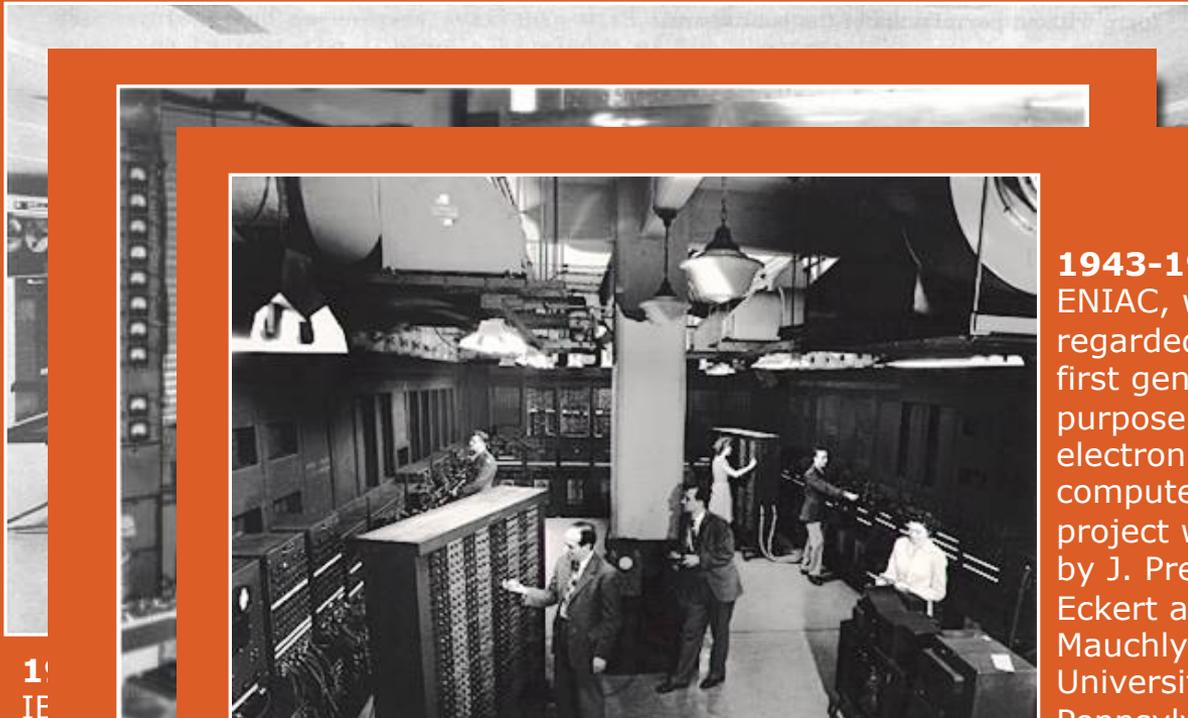
**1958**  
Transistor radio



**1961**  
First commercial monolithic integrated circuit, Fairchild

# Computers and Computing

By the late 1950s electronic computers had evolved from science fiction to tools for scientific research and large business applications. Alongside rose a new profession, that of the computer engineer.



19  
IE

19  
Joh

**1943-1946**  
ENIAC, widely regarded as the first general purpose electronic digital computer. The project was led by J. Presper Eckert and John Mauchly at the University of Pennsylvania.

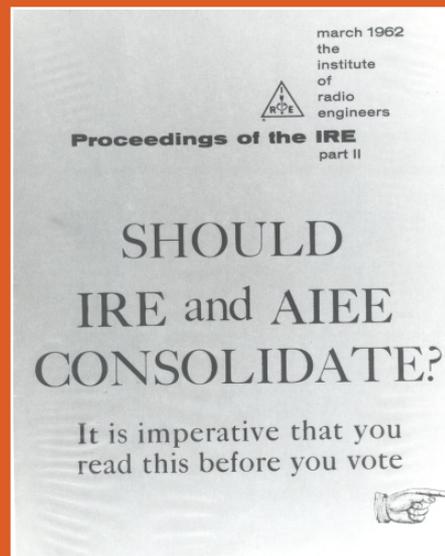
# AIEE + IRE = IEEE

The idea that there should be one organization for all electrical engineers was an old one, and became more powerful as the profession expanded beyond its separate roots in power and radio. In 1962, the boards and memberships of the two institutes agreed to merge. On January 1, 1963, the IEEE, or Institute of Electrical and Electronic Engineers was born with 150,000 members, 140,000 of whom were in the United States.



**1962**

Symposium on the proposed merger, IRE National Convention



Special merger issue of the Proceedings of the IRE



The badge of the new IEEE combined the right hand rule from the IRE with the kite from the AIEE

# IRE Chicago Section Directory



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Recognizing IRE Chicago Section 25<sup>th</sup> Anniversary

# SCANFAX

September 2003  
Volume 55, Issue 7



Chicago Section Website:  
[www.ehw.ieee.org/r4/chicago](http://www.ehw.ieee.org/r4/chicago)  
A publication of the  
Institute of Electrical & Electronics Engineers  
— Chicago Section —

## The World's Columbian Exposition

Catalyst to the Founding of the Chicago Section



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Columbus, Wisconsin

## The Columbian Exposition Helped

- It showcased Chicago's technology strength.
- The International Electrical Congress was also being held at the fair in which the Institute had much interest since international units-of-measure were being decided upon.
- There was a chance for face-to-face meetings with Institute leaders.
- Incoming AIEE president Edwin Houston attended the fair and was impressed.

# Western Engineers Petition the Institute

## What the Western Engineers Wanted

- They wanted to hold their own meetings in Chicago.
- New York was too far away to make monthly meeting attendance practical.
- Institute members who lived in Chicago wanted to know what value they received from their \$10 annual dues.

## What New York Said

- This is an old issue that has been kicking around for some time.
- Getting together informally posed no problem but being recognized as an autonomous group would weaken the Institute.
- We cannot have local entities publishing papers of dubious quality.
- If Chicago is made a local chapter – what does that make of New York?

# An Institute Committee Responds with a Compromise

- Local meetings can be held as long as 20 members request it.
- Local members will appoint:
  - a honorary secretary as intermediary to the Institute.
  - a chairman for the meeting.
- The Institute will still control papers requiring that they be first read in New York.
- There was no mention of forming local entities such as sections which would come later.

# 20 Signatures Required to hold first Local Meeting

## Signers of Petition for Local Meetings in Chicago

*Prepared by: Don Harris      Info from: Francis Cox, George Spisak*

**Transmitted by Edward Caldwell, February 20, 1894**

Charles G. Armstrong .. A '92 (Sept. 27)	Fred De Laud.....A '92 (Feb. 16)
B. J. Arnold .....A '92 (Oct. 25), M '93	C. C. Haskins ..... A '93 (Sept. 20)
F. B. Badt (Lt.) ..... A '92 (Apr. 19)	Samuel Insull ..... A '86 (Dec. 7)
A. H. Bauer ..... A '90 (Feb. 7), M '91	Elbert F. Norton..... A '93 (Dec. 20)
N. H. Bentley ..... A '93 (Oct. 18)	S. E. Nutting ..... A '93 (Sept. 20)
Lem S. Boggs ..... A '93 (Sept. 20)	R. S. Pierce .....A '93 (Apr. 18), M '93
Charles A. Brown ..... A '87 (July 12)	William D. Ray ..... A '92 (Sept. 27)
Edward Caldwell, Chairman of Committee ..... A '91 (Jan. 20)	Samuel Rodman, Jr. .... A '90 (Sept. 16)
Louis K. Comstock..... A '93 (Dec. 20)	Henry J. Sage ..... A '93 (Dec. 20)
F. W. Cushing..... A '91 (Nov. 24)	Leland L. Summers .....A '92 (Feb. 16)
	Charles Wirt ..... A '88 (Sept. 8)



Samuel Insull

# SCANFAX

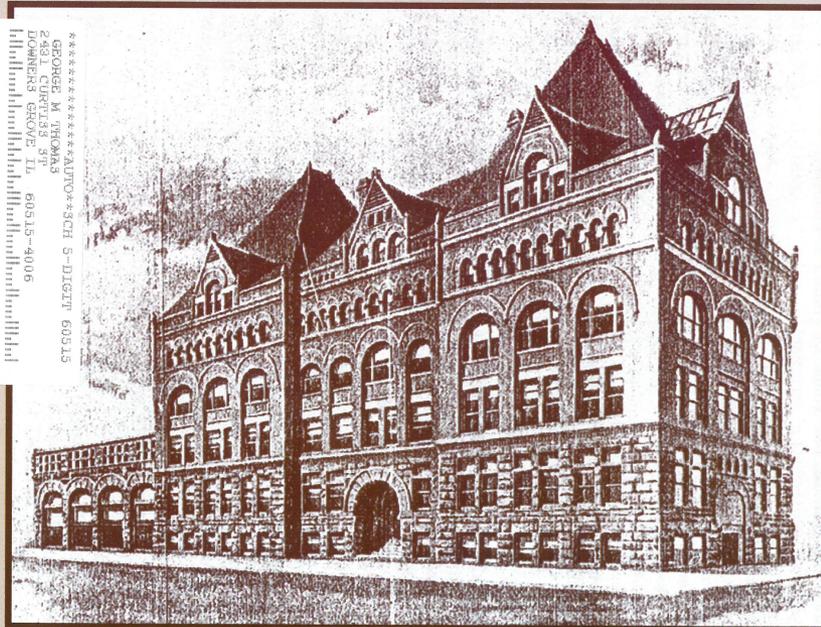
March 2004

Volume 56, Issue 3



Chicago Section Website:  
www.ewh.ieee.org/r4/chicago

A publication of the  
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— Chicago Section —



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## Meeting of the AIEE Western Members at Chicago

Inaugural Meeting of the Chicago Section

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Columbus, Wisconsin

## Inaugural Meeting March 21, 1894



Professor Stine of the  
Armour Institute offered his  
lecture room for the meeting



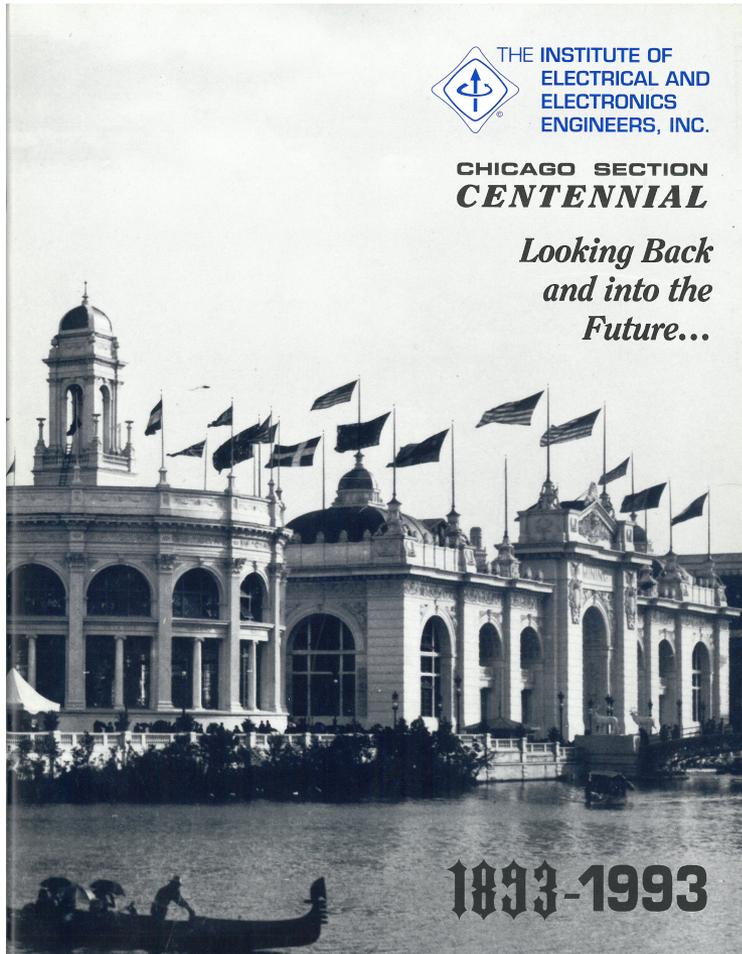
Celebrating 125 Years  
of Engineering the Future

# IEEE Recognizes the Chicago Section



Chicago Section recognized as the first section formed outside of headquarters

# Chicago Section Celebrates 100 Years



*Centennial Celebration*  
*October 9, 1993 • 6:30 P.M.*

Museum of Science  
and Industry  
57th Street and  
Lake Shore Drive  
Chicago, Illinois



*Celebrate 100 Years of  
engineering contributions  
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*For more information contact the*  
IEEE Chicago Section Office,  
30 North Michigan Ave., Suite 508,  
Chicago, Illinois 60602  
312 • 236 • IEEE

# 1993 Centennial Celebration



Over 400 people dined in the rotunda of the Museum

*Institute of Electrical and Electronics Engineers*

*Chicago Section*



## INAUGURAL MEETING

Held on March 21, 1894 at the Armour Institute

## REENACTMENT

*"On the Effect of Heavy Gases in the Chamber of An Incandescent Lamp"*  
*by Professor William A. Anthony*



March 23, 2004

Illinois Institute of Technology  
McCormick Tribune Campus Center  
33rd and State Streets, Chicago, Illinois

# Engineers as Reenactors



**Professor Dugald Jackson**  
chaired the EE departments first  
at Wisconsin and then at MIT

***The IEEE Chicago Section continues to  
make history***

***Thank You***