SEE THE USA THE AIEE WAY

Meet Me in St. Louie at the International Electrical Congress and the Louisiana Purchase Exposition

Dr. Mary Ann C. Hellriegel
Institutional Historian and Archivist, IEEE History Center
3 November 2022
PANORAMA OF THE WORLD'S FAIR, ST. LOUIS, 1904.

LOUISIANA PURCHASE EXPOSITION, CELEBRATING THE CENTENNIAL OF THE PURCHASE OF THE LOUISIANA TERRITORY,
OPEN APRIL 30TH, CLOSES DECEMBER 1ST.
Louisiana Purchase Exposition: The St. Louis World’s Fair

- International exposition, held in St. Louis, Missouri, USA, from 30 April to 1 Dec. 1904
- Local, state, and federal funds totaling $15 million ($500,238,202 on 3 Nov. 2022) were used to finance the event.
- More than 60 countries and 43 (of 45) American states maintained exhibition spaces at the fair
- Area = 1,270 acres (510 hectares) [area now Forest Park and part of Washington University campus]
- Visitors = 19,694,855 (nearly 19.7 million people)
- Historians generally emphasize the prominence of the themes of race and imperialism and the fair's long-lasting impact on intellectuals in the fields of history, art, architecture, and anthropology.
- From the point of view of the memory of the average person who attended the fair, it primarily promoted entertainment, consumer goods, and popular culture
- 1904 Summer Olympics
Popular Culture and Myths

- The ice cream cone is Missouri’s official dessert.
- While the invention of the ice cream cone predates 1904, the fair popularized:
  - Ice Cream Cone (hand rolled waffle)
  - Hot Dog
  - Hamburger
  - Peanut Butter
  - Cotton Candy
  - Iced Tea
  - Jell-o
  - Dr. Pepper
  - Puffed Rice
IEEE Foundation
Third “Modern” Olympics

- Modern Olympics
  - 1896, Athens
  - 1900, Paris
  - 1904, St. Louis
- Took place in St. Louis over several months
- First time medals were awarded
- Right: Finish of the first heat of the “100-yard handicap”
- Note: First winter Olympics, 1924
The AIEE invited the Institution of Electrical Engineers (IEE) of Great Britain to visit the United States and to hold a joint meeting in connection with the International Electrical Congress at the St. Louis World’s Fair in September 1904.

The AIEE also invited the IEE and members of other European electrical engineering societies to join a circular ten-city tour, visiting important industrial centers, starting in Boston, and more than 3,000 miles later in Philadelphia.
AIEE Invited the IEE and Members of Other Societies

- In 1904, twenty years after its founding, the AIEE once again found itself in the spotlight as engineers, electricians, and scientists planned to gather for another International Electrical Congress.

- The assembly took place at the Louisiana Purchase Exposition in St. Louis, Missouri.

- Federal, state, and local funds amounting to $15 million financed the world’s fair marking the Louisiana Purchase’s centennial.

- Open from 30 April 30 to 1 December 1904, the St. Louis world’s fair attracted almost 20 million visitors, including many participants in the International Electrical Congress (and other congresses).
AIEE Appoints Committee to Organize Local Committees

- **Sept. 1902 Board of Directors Meeting**
  - Appointed a Committee on Local Organization for promoting the organization of local meetings
  - Primary purpose of local meetings had been to read papers
  - “The important work of the Institute is done by committees appointed by the President.”
    - There are six standing committees
    - Special committees vary from time to time in personnel and number – in 1904, there were 21

- **AIEE Office Location**
  - 1890-1894: 12 West 31st St. with American Society of Mechanical Engineers
  - 1894-1901: 26 Cortland St (needed more space and left co-office with ASME)
  - 1901-1906: 95 Liberty St., 7th floor – Executive Office and Library
  - 1903 – offer from Andrew Carnegie for joint engineering building (offer increased in 1904)
  - 1906: United Engineering Building and another building, Engineers’ Club, plan to be occupied by 1 May 1906
AIEE Planned Excursion for Visitors to the Fair and Congress

- The 1904 excursion before and after the world’s fair in St. Louis and the International Electrical Congress, the joint meeting with Institute of Electrical Engineers (London) was a very big deal.

- AIEE members wrote and AIEE published ten tour books (125 to 300 pages each) and made all those arrangements to set up and conducted the excursion.

- AIEE members also edited and published the three-volume collection of papers presented at the International Electrical Congress.

- On Right: United Engineering Building, 29 West 39th St.
At the last International Electrical Congress held in Paris in 1900, the AIEE was represented by official delegates and visiting members, and they were “splendidly entertained” in London en route to Paris by the Institute of Electrical Engineers (IEE).

The AIEE reciprocated, inviting the Institution of Electrical Engineers of Great Britain to visit the United States and to hold a joint meeting in St. Louis in connection with the International Electrical Congress in mid-September 1904.

Abord the *RMS Republic* (or *SS Republic*) Members of the Institution of Electrical Engineers, “many accompanied by ladies,” arrived in Boston harbor on 2 September.

The International Electrical Congress’s Boston Reception Committee, AIEE members, and dignitaries welcomed IEE members and others awaiting the start of the grand expedition.

About 150 people joined the three-week circular tour, which started in Boston and ended more than 3000 miles later in New York City on 21 September (see map).

The party traveled in style aboard special trains, trolleys, and street cars independent of the regular commercial schedules. In addition, sixteen ladies accompanied the party and “…contributed notably to the gayety and enjoyment of the trip.”
IEEE Foundation

The IEE Accepted the AIEE’s Invitation and Journeyed to the USA in 1904

- “The American Institute of Electrical Engineers offered cordial welcome to the Institution to meet them in 1903 at Montreal, or – if preferred – at a Congress to be held in 1904 at St. Louis during the Louisiana Purchase Exposition.”
- “On account of the contemplated Italian visit [with extension to Switzerland] for 1903, the American visit was accepted for 1904.”
- September [1904] there was “co-operation” with The AIEE at the International Electrical Congress
  - 6 Members were appointed as Delegates of the IEE
  - Matters discussed related chiefly to Electro-magnetic Units and International Standards.
  - 61 Members, accompanied by 10 ladies, journeyed to America and Canada, where they were entertained in accordance with a ‘comprehensive programme’ including visits to power stations, universities, electrical works and laboratories, and an excursion to Niagara.
  - Before leaving St. Louis, the IEE President Alexander Siemens entertained the Hosts and Delegates at the New York State House in the grounds of the Word’s Fair.
IEE’S Transportation: *RMS Republic*, White Star Line

- Steam-powered ocean liner built in 1903 by Harland and Wolf in Belfast, Ireland
- “The Millionaire’s Ship”
- Flagship of White Star Line's Boston service
- Transatlantic voyage from Liverpool to Boston arrived on 2 Sept. 1904
- The ship was lost at sea in a collision in 1909
Bust of President Roosevelt sculptured in butter, Louisiana Purchase Exposition
10 AIEE Electrical Handbooks for the 3088 Mile Tour

- Boston, Massachusetts
- New York, New York
- Schenectady, New York
- Montreal, Canada
- Niagara Falls, New York
- Chicago, Illinois
- St. Louis, Missouri
- Pittsburg, Pennsylvania
- Washington, D.C.
- Philadelphia, Pennsylvania

**THE ST. LOUIS ELECTRICAL HANDBOOK**

Being a Guide for Visitors from Abroad Attending the International Electrical Congress, St. Louis, Mo. September, 1904.

**MEMORANDUM.**

This electrical handbook is one of a series of ten similar handbooks prepared under the auspices of the American Institute of Electrical Engineers by the local Reception Committees in the cities of Boston, New York, Schenectady, Montreal, Niagara Falls, Chicago, St. Louis, Pittsburg, Washington, and Philadelphia. These are the stopping places on the circular tour organized by the Institute for the reception and entertainment of its foreign guests who visit the United States in connection with the International Electrical Congress at St. Louis, September 12th to 17th, 1904. It is hoped in these handbooks to present short historical sketches of the cities visited and a rapid survey of the power plants and important electrical industries along the route.

St. Louis.

St. Louis
Published under the auspices of
The American Institute of Electrical Engineers
1904

No. 584
AIEE’S Ten Electrical Handbooks

“This electrical handbook is one of a series of ten similar handbooks prepared under the auspices of the American Institute of Electrical Engineers by the local Reception Committees in the Cities of Boston, New York, Schenectady, Montreal, Niagara Falls, Chicago, St. Louis, Pittsburg, Washington, and Philadelphia.

These are the stopping places on the circular tour organized by the Institute for the reception and entertainment of its foreign guests who visit the United States in connection with the International Electrical Congress at St. Louis, 12-17 September 1904.

It is hoped in these handbooks to present short historical sketches of the cities "visited and a rapid survey of the power plants and important electrical industries along the route."

AIEE Electrical Handbooks for 1904 St. Louis World's Fair (and related publications) are available on Engineering and Technology History Wiki https://ethw.org/Archives:AIEE_Electrical_Handbooks_for_1904_St._Louis_World%27s_Fair
Map

- 3088 miles
- Map in the AIEE’s *Boston Electrical Handbook* (1904)
<table>
<thead>
<tr>
<th>SEPTEMBER</th>
<th>LOCATION</th>
<th>HOTEL/HEADQUARTERS</th>
<th>DESTINATIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>RMS Republic arrive in Boston Harbor</td>
<td>Hotel Vendome</td>
<td>Power plants, parks, MIT, Harvard</td>
</tr>
<tr>
<td>3 and 4</td>
<td>Boston</td>
<td>Hotel Vendome Fall River Line steamboat</td>
<td>J.G. White &amp; Co, hosted steamboat excursion Reception comm. tours power stations</td>
</tr>
<tr>
<td>4 and 5</td>
<td>New York</td>
<td>No assigned hotel</td>
<td>General Electric Co. works and offices</td>
</tr>
<tr>
<td>6</td>
<td>Schenectady</td>
<td>(NY Central &amp; Hudson RR)</td>
<td>Falls and Whirlpool, power plants</td>
</tr>
<tr>
<td>7 and 8</td>
<td>Montreal</td>
<td>Windsor Hotel</td>
<td>Reception at McGill Univ., power plants</td>
</tr>
<tr>
<td>9</td>
<td>Niagara Falls</td>
<td>(Michigan Central RR)</td>
<td>International Electrical Congress, 12-17 Sept.</td>
</tr>
<tr>
<td>10</td>
<td>Chicago</td>
<td>(Illinois Central Railway)</td>
<td>Breakfast at Leland Hotel, trolley to Lincoln’s Tomb</td>
</tr>
<tr>
<td>11 to 17</td>
<td>St. Louis</td>
<td>Jefferson Hotel</td>
<td>Westinghouse Electric &amp; Mfg. Co., Westinghouse Air Brake foundries</td>
</tr>
<tr>
<td>18 and 19</td>
<td>Pittsburg</td>
<td>Shenley Hotel</td>
<td>Formal dedication of U.S. Bureau of Standards; White House</td>
</tr>
<tr>
<td>20</td>
<td>Washington, D.C.</td>
<td>(Pennsylvania Railroad)</td>
<td>Independence Hall, power plants</td>
</tr>
<tr>
<td>21</td>
<td>Philadelphia</td>
<td>Bellevue-Strafford Hotel</td>
<td>(special train from Washington, D.C.)</td>
</tr>
<tr>
<td>21</td>
<td>Tour ends on return to New York City</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Hotels: Overnight Stays, Meals, and Events

- **Hotels Overnight Stays**
  - **Boston - Hotel Vendome**
    - 2 and 3 Sept. (2 nights)
  - **New York City, no headquarter hotel**
    - 4 and 5 Sept. (2 nights)
  - **Montreal - Windsor Hotel**
    - 7 and 8 Sept. 1904 (1 night)
  - **St. Louis - Jefferson Hotel**
    - 11 – 17 Sept. 1904 (6 nights)
  - **Pittsburg - Shenley Hotel**
    - 18 and 19 Sept. 1904 (1 night)
  - **Philadelphia – Bellevue-Strafford Hotel**
    - 21 Sept. 1904 (1 night)
  - **Some night sleep on either boat or train**

- **Meals Stops**
  - **Saratoga, NY (Schenectady to Montreal)**
    - United States Hotel dinner on 6 Sept
  - **Chicago**
    - Leland Hotel – breakfast on 10 Sept.
  - **Washington, D.C.**
    - Willard Hotel – breakfast on 20 Sept
Hotel Vendome, Boston, Mass.

- Boston’s premier hotel
- Commonwealth Ave corner Dartmouth St. (Back bay)
- Built in 1872 (William G. Preston, architect) and expanded in 1882
- After the expansion, the hotel served both transient guests and permanent residents
- One of the earliest (perhaps the first) commercial installation of electric lights in the city
- Massive fire, 17 June 1972
Boston: Welcome and Being Tour of USA

- Local reception committee hosted visitors at Hotel Vendome, 2 Sept.
- Morning, 3 Sept. automobiles took visitors to powerhouses and other points of electrical interest
- Cambridge, Mass. – informal reception by Harvard University and lunch at Harvard Union
- Afternoon visit MIT
- Early evening, train to Fall River, Mass. and overnight steamboat to NYC
  - Steamer, Priscilla on the Fall River Line
Fall River Line: Docked at Pier 14 in Manhattan

- Night boats on the East Coast regularly sailed between New York and New England for nearly a century, from 1847 until 1937.
- Boston was the primary destination except for the summer season, from June to September, when Maine’s coastal resorts, such as Bar Harbor, rivaled as preferred ports of call.
- Fall River Line was the premier operation and operated the most famous night boats for travelers between New York and Boston.
New York City

- **4 Sept.** – arrive in NYC by Fall River boat, 7:30 am
  - Check into hotel of choice
  - Afternoon – gust of Messrs. J.G. White & Co. on steamboat excursion
- **5 Sept.** – guests of NY reception committee
  - Tour power stations and other points of interest
  - Evening – Formal reception and dinner hosted by AIEE
- **6 Sept.** – special trains leaves NYC at 8:45 am
  - NY Central and Hudson River Railroad to Albany along easts shore of Hudson River, passing Palisades, U.S. Military Academy at West Point, and heading up Mohawk Valley after Albany
  - Reach Schenectady at 12:45 pm
New York City Area Sites of Interest

- Columbia University
  - Scientific Dept., Columbia School of Mines
  - Electrical Dept.
- Thomas Edison’s Laboratory – West Orange, New Jersey
- The Electrical Testing Laboratory, 80th St. & East End Ave.
- Power Plants
  - New York Edison Co.
  - Edison Electric Illuminating Co. of Brooklyn
- Transportation:
  - Railroads and Street Railways
  - NYC subway opened 27 Oct 1904
- Communication:
  - Telephone System and Western Union Telegraph Co.

- Manufacturers in New York City and its vicinity expressed willingness to permit visitors
  - The A.B. See Electric Elevator Co.
  - Cooper-Hewitt Electric Co.
  - Crocker-Wheeler Electric Co.
  - Foote, Pierson & Co.
  - Marine Engine and Machine Co.
  - Otis Elevator Co.
  - Ward Leonard Electric Co.
  - Western Electric Co.
  - The Willyoung & Gibson Co.
Schenectady: General Electric Works
Schenectady to Montreal, 241 miles

- Afternoon, 6 Sept.
  - Special high-speed trolleys to Saratoga for dinner at the United States Hotel
  - Special train leaves at 10:30 pm, Delaware & Hudson Route along Lake Champlain

- 7 Sept. arrive at Montreal at 10:30 pm
Windsor Hotel, Montreal, Canada

- Dominion Square and the Windsor Hotel, ca. 1890
- Montreal, Canada’s largest city
- Opened in 28 Jan. 1878 (closed 1981)
- Many consider it the first grand hotel in Canada
- The hotel was buoyed by the successes of the Montreal Winter Carnivals of the 1880s, which were held in the square outside the hotel
- Became center of Montreal’s business and social worlds, attracting not only railway visitors, but also business leaders, politicians, socialites, artists, and even royalty
Niagara Falls Area

- 8 Sept. – special train left Montreal
- Arrive from Montreal at 9 a.m. with breakfast on train
- Start day visiting the Falls
- Lunch with Niagara local committee
- Visit powerhouses of Niagara Falls Power Co., the Niagara Falls Hydraulic Power Co., and electro-chemical works powered by companies
  - Union Carbide Co. and Carborundum Co
- 6 p.m. depart on Michigan Central Railway with dinner and night aboard
Tenants on Lands of Niagara Falls Power Co.
Railroad Experience: Dining and Sleeping

Dining Car, D.L.&W R.R., 1900-1905

Sleeping Cars, c. 1905
Michigan Central Railroad: Niagara to Chicago

- The Niagara Cantilever Bridge (1892)
Chicago and Springfield, Illinois

- 10 Sept. tour power plants and other sites in Chicago and depart by special train
- 11 Sept. arrive at 7:30 a.m. on overnight train from Chicago
- Breakfast at Leland Hotel
- Trolley cars to Pres. Abraham Lincoln’s tomb
  - Pres. T. Roosevelt at Tomb, 1903
- Resume special train, reaching St. Louis at 12 noon
Illinois Central Railroad: Chicago to St. Louis

- Chicago Depot, 1901
- Sleeping Berth on Deluxe Train
Hotel Jefferson, St. Louis

- Built to serve Louisiana Purchase Exposition visitors; Architect firm: Barnett, Hayes & Barnett
  - 12-story; 400 rooms
- Hosted charity ball on 2 April 1904
- Opened for overnight guests on 29 April 1904
- Democratic National Convention was held at the hotel in 1904 and 1916
- Expanded in 1928
- Listed in the National Register of Historic Places on 24 Oct. 2003
### TIMELINE – Louisiana Purchase Exposition

1901  Planning and construction for the Louisiana Purchase Exposition begins. President McKinley issues a proclamation inviting the international community to participate.

1902  Although Exposition organizers had planned for a 1903 opening, it is delayed to 1904 to complete the preparations for what would be the largest World’s Fair.

30 Apr. 1903  The dedication ceremonies commemorating the centennial of the signing of the Louisiana Purchase Treaty are held, though the Exposition will not officially open for another year.

30 Apr. 1904  The official opening day of the Fair – both President Roosevelt and Secretary of War William Howard Taft participated in the opening ceremonies.

12–17 Sept. 1904  International Electrical Congress: 160 papers over five days

1 Dec. 1904  Closing night of the Fair.
IEEE Foundation
Under Construction

• Officially, the Louisiana Purchase Exposition, but known as the St. Louis World’s Fair
• A bird's-eye view of construction, Jan. 1904
• Dedication Date: 30 April 1903
  • Opening delayed one year
• Opening Date: 30 April 1904
• Closing Date: 1 Dec. 1904
• $15 million (local, state, federal funds)
  • More than $500 million today (31 Oct 2022)
Dedication Ceremony, 30 April 1903

- Centennial anniversary of the signing of the Louisiana Purchase Treaty (1803), 30 April 1903
- President Theodore Roosevelt Attended
- The United States purchased 828,000 square miles of land west of the Mississippi River for $15 million from France (almost $394 million on 31 Oct. 2022)
  - About 4 cents per acre
  - US doubled its size
THE ST. LOUIS ELECTRICAL HANDBOOK

Being a Guide for Visitors from Abroad Attending the International Electrical Congress, St. Louis, Mo.
September, 1904

CONTENTS

<table>
<thead>
<tr>
<th>The City of St. Louis</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>International Electrical Congress</td>
<td>17</td>
</tr>
<tr>
<td>St. Louis Exposition</td>
<td>43</td>
</tr>
<tr>
<td>Historical</td>
<td>45</td>
</tr>
<tr>
<td>The Grounds</td>
<td>50</td>
</tr>
<tr>
<td>Interesting Facts about the Exposition</td>
<td>57</td>
</tr>
<tr>
<td>Features of the Exposition</td>
<td>59</td>
</tr>
<tr>
<td>The Cascades</td>
<td>65</td>
</tr>
<tr>
<td>Illumination of the Exposition</td>
<td>70</td>
</tr>
<tr>
<td>Transportation within the Grounds</td>
<td>75</td>
</tr>
<tr>
<td>Intercommunication on the Grounds</td>
<td>81</td>
</tr>
<tr>
<td>Power of the Exposition</td>
<td>87</td>
</tr>
<tr>
<td>Power for Intramural Railway</td>
<td>89</td>
</tr>
<tr>
<td>Lighting and Power</td>
<td>92</td>
</tr>
<tr>
<td>Steam, Gas and Fuels Building</td>
<td>95</td>
</tr>
<tr>
<td>Arrangement of Electrical Exhibits in the Palace of Electricity</td>
<td>100</td>
</tr>
<tr>
<td>Special Exhibit</td>
<td>107</td>
</tr>
<tr>
<td>New Applications of Electric Motors Exhibited</td>
<td>117</td>
</tr>
<tr>
<td>Foreign Electrical Exhibit</td>
<td>122</td>
</tr>
<tr>
<td>Argentina—Belgium</td>
<td>122</td>
</tr>
<tr>
<td>Brazil—Canada—Denmark—France</td>
<td>123</td>
</tr>
<tr>
<td>Germany</td>
<td>129</td>
</tr>
<tr>
<td>Great Britain</td>
<td>131</td>
</tr>
<tr>
<td>Italy—Japan</td>
<td>133</td>
</tr>
<tr>
<td>Mexico—Portugal</td>
<td>135</td>
</tr>
<tr>
<td>Electric Railways</td>
<td>137</td>
</tr>
<tr>
<td>St. Louis Transit Company</td>
<td>139</td>
</tr>
<tr>
<td>The St. Louis and Suburban Railway</td>
<td>151</td>
</tr>
<tr>
<td>East St. Louis and Suburban Railway</td>
<td>155</td>
</tr>
<tr>
<td>Electric Lighting and Power Stations</td>
<td>163</td>
</tr>
<tr>
<td>The Union Electric Light and Power Company</td>
<td>169</td>
</tr>
</tbody>
</table>

viii  Contents  PAGE

<table>
<thead>
<tr>
<th>The Ashley Street Plant</th>
<th>171</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Imperial Plant</td>
<td>194</td>
</tr>
<tr>
<td>Missouri Edison Station “A”</td>
<td>201</td>
</tr>
<tr>
<td>Missouri Edison Station “B”</td>
<td>205</td>
</tr>
<tr>
<td>Present Distribution Systems</td>
<td>208</td>
</tr>
<tr>
<td>General Plan of Future Distribution</td>
<td>213</td>
</tr>
<tr>
<td>Direct-Current Series Arc Street Lighting</td>
<td>215</td>
</tr>
<tr>
<td>The Construction of Subways</td>
<td>218</td>
</tr>
<tr>
<td>Construction of Service Connections</td>
<td>219</td>
</tr>
<tr>
<td>The Electric Plant of the Laclede Power Company of St. Louis</td>
<td>227</td>
</tr>
<tr>
<td>The Electric Plant of the Laclede Gas Light Company</td>
<td>229</td>
</tr>
<tr>
<td>The Telephone in St. Louis</td>
<td>231</td>
</tr>
<tr>
<td>The Bell Telephone Company of Missouri</td>
<td>235</td>
</tr>
<tr>
<td>The Kinloch Telephone Company</td>
<td>247</td>
</tr>
<tr>
<td>Isolated Electrical Plants</td>
<td>253</td>
</tr>
<tr>
<td>Washington University</td>
<td>255</td>
</tr>
<tr>
<td>The Anheuser-Busch Brewery</td>
<td>256</td>
</tr>
<tr>
<td>The New Carleton Wholesale Building</td>
<td>263</td>
</tr>
<tr>
<td>Electrical Manufacturing Plants</td>
<td>257</td>
</tr>
<tr>
<td>The Wagner Electric Manufacturing Company</td>
<td>269</td>
</tr>
<tr>
<td>The Emerson Electric Manufacturing Company</td>
<td>275</td>
</tr>
<tr>
<td>The Moloney Electric Company</td>
<td>277</td>
</tr>
<tr>
<td>The Columbia Incandescent Lamp Company</td>
<td>280</td>
</tr>
<tr>
<td>The U. S. Incandescent Lamp Company</td>
<td>284</td>
</tr>
</tbody>
</table>
AIEE’S HEADQUARTERS in the Palace of Electricity
“Edisonia”

A Brief History
of the early
Edison Electric Lighting System

Compiled and Published
Under the Auspices of the Committee on St. Louis Exposition
of the
Association of Edison Illuminating
Companies

NEW YORK
1904
AEIC’S Headquarters

Prefatory Note

This volume, issued under the auspices of the Committee on St. Louis Exposition of the Association of Edison Illuminating Companies, is uniform in size and binding, and in general make-up similar to the series of Electrical Handbooks issued under the imprint of the American Institute of Electrical Engineers, in connection with the entertainment of the foreign visitors to the International Electrical Congress, St. Louis, September 13-17, 1904, and may well be considered as completing the series. It contains a series of views and descriptions of the important features of the valuable collection of “Edenica” brought together by the Committee in the Exhibit of the Association at St. Louis, and a series of articles containing interesting historical matter in connection therewith. Much of the material in the Exhibit is of great historic value, and the Committee desires to express the hope that it may be possible to keep the collection together and find for it a permanent place, where its importance in the history of the art may receive proper appreciation by the engineering specialists and the public at large.

The Committee desires to record the great interest manifested in its work by Thomas A. Edison, and the loan by him of valuable historical exhibits; it is indebted for most efficient co-operation to J. C. Henderson, in charge of the installation and arrangement of the exhibits at St. Louis, and W. S. Andrews, in charge of the collection of the material; to The General Electric Company, W. J. Jennes, C. L. Clarke, W. J. Hammer, the Estate of Luther Steiger, and others for the loan of valuable historical exhibits and assistance in their presentation; and to Miss Cornelia Beckwith for cooperation in the editing of the Handbook.

The Committee on St. Louis Exposition:

S. Imrie Lowry, Chairman;
Chas. L. Edgar,
J. W. Lieb, Jr.,
Thos. E. Murray.

The Association of Edison Illuminating Companies:

Jas. B. McCall, President.
Meet Me in St. Louis at the Fair

The St. Louis World’s Fair also known as the Louisiana Purchase Exposition,

- 30 April to 1 December 1904, in Forest Park, St. Louis, Missouri.
- Commemorated the 1803 purchase of land that more than doubled the size of the United States.
- Originally planned for 1903, it was delayed to 1904 to permit the completion of construction for states, foreign countries, and the gathering of countless exhibits from around the world.
- By far the largest of the several Victorian-era world’s fairs, the fair occupied more than 1,200 acres at the western edge of St. Louis, then the third-largest city in the U. S.
- More than twelve million visitors paid 50 cents admission ($16.67 on 31 Oct. 2022) to see the Fair’s exhibits from participating companies, states and countries.
Deforest Wireless Telegraph Tower

- Wireless Telegraphy on the same page as Animal Exhibits? Why or Why not?
- Classification and Organization
  - How do you organize
  - Where do you put things
  - Exhibit Buildings
  - The Grounds
  - The Pike
President Theodore Roosevelt, Starting Fountains and Machinery, formally Opening the Fair, 30 April 1904
Opening Day, 30 April 1904

- Dignitaries
- Pageantry
- Symbolism
- The Public

A World’s Fair as a World Stage
- Oh, the pressure
- The Media
- Nature and the “scientific” press
- Popular culture
- So, what?
Why note “tie the knot” atop De Forest Tower?

- Bride and groom pose for their wedding photograph at the top of the De Forest Wireless Telegraph Tower at the Louisiana Purchase Exposition.

- The *St. Louis Post-Dispatch* reported that Violet E. Ingle and Alfred M. Landers, both from Worden, Illinois, were married on 12 June 1904, on the highest platform of the tower by the Reverend Dr. B. C. Palmer, a pastor of Lafayette Presbyterian Church in St. Louis. The top of the 300-foot tower was a popular attraction at the fair.
Landscapes of Technology
Anna Ollie Stuart, six-year-old visitor from Sparks, Nevada

- Dressed in her finery to ride the Ferris wheel.
- Stuart’s daughter recalled:
  - “When I was little, she always told us it was magical to see all the electric lights.
  - No place she lived at that time had electricity.
  - Sparks (Nevada) had gas-lamps, etc., so a little girl from Nevada must have been overwhelmed.
  - At ninety, she told me she still dreamed about looking out at night over all the lighted Palaces at the fair.”
Brilliant illumination of the Electricity Building at night, Louisiana Purchase Exposition, St. Louis, U. S. A.
Wonderment: Cascades by Night and the Ferris Wheel by Day
View of the East Cascade Falls, looking toward the Palace of Electricity

- 525' x 644', about 7 acres
- Cost $413,000
- Exhibited electrical equipment and appliances, x-ray machine, telegraph, telephone, wireless telegraphy, batteries, and dynamos
Electricity

- Powered fountains, signs and the Ferris Wheel
- Electric lighting illuminated and beautified the fairground buildings, reflecting in the lagoon at night.
- An early use of outdoor electric lighting; people at the time were more accustomed to gas and oil lamps.
- Inventions debuting included: the electric typewriter, the plug with wall outlet, and the electric dumbwaiter.
- As one of several “palaces” dedicated to technological advancements, the Palace of Electricity featured exhibits where fair-goers could observe these inventions and foreshadowed the role electricity would play in powering the modern world.

Electricity and Machinery Buildings
LET THERE BE LIGHT: “The marvels of electrical development are...deeply impressive”

Electric Light: “The Wizard of Menlo Park - exhibition among his personal relics the earliest forms of incandescent light. Crude they were. But the development of light production by electricity is not the chief cause for wonder. From the humble beginning of light by electricity for illumination has come light in many forms for widely varied purposes.”

X-ray Tubes: “With the X-ray tubes and their mysterious power...penetrate the physical tissues...”

Finsen Light Rays: “remedial effect when applied with scientific detail to certain diseases. The electric light bath in which intensity and colors are employed to build up the human system and to restore vitality almost taxes credulity.”

Vapor arc lamps: “intense white light, the absence of the red rays resulting in a peculiar effect. Vacuum tubes are made to yield a beautiful glow.

Search Light. “The glow of a search light is now visibly nearly three hundred miles.”

Wireless Telegraphy/Telephony: “But a searchlight which talks is even more astonishing. In this case the light is connect with a telephone. The rays carry the voice. They deliver the sounds into a concave mirror which focuses them into the receiver held at the ear.”
MACHINERY HALL

By J. M. Chaphe.

The Westinghouse Engine Company exhibits four vertical compound engines of 3200 h.p. each that are direct-connected to 2000 k.w. generators. They also exhibit a 300 h.p. steam turbine and a 300 h.p. gas engine.

The Allis-Chalmers Company exhibits a combined horizontal and vertical 5000 h.p. compound engine direct connected to a 3500 k.w. Bullock generator.

The Mülhouse Engine Company (of Germany), exhibits a tandem compound 1000 h.p. engine.

The Willans Engine Company exhibits a triple triplex 1000 h.p. engine.

The Buckeye Engine Company exhibits a cross-compound 1000 h.p. engine.

The Hamilton-Corliss Engine Company exhibits a vertical 2250 h.p. engine. They also exhibit a 1500 h.p. steam turbine.

The Brown-Corliss Engine Company exhibits an 800 h.p. and a 500 h.p. compound vertical engine.
The Intramural Railway service is furnished by four engines made by the Murray Iron Works, the Harrisburg Engine Company, the Lane & Bodley Engine Company and the Greenwald Engine Company of 1000 h.p. each.

The Otto Gas Engine Company exhibits several sizes of gas engines.

Fairbanks, Morse & Company exhibit several sizes of gas engines.

The General Electric Company exhibits several steam turbines.

The Niles-Bement Company exhibits a 20-foot swing boring-machine, besides a full series of machine tools.

All the above engines are located in the western part of Machinery Hall and receive their steam from a header carried in an underground conduit. They aggregate about 38,000 h.p.
The Boiler House is immediately west of Machinery Hall and has the following equipment, aggregating about 40,000 h.p.:
Sixteen Babcock & Wilcox water-tube boilers, 450 h.p. each, equipped with Roney stokers and operated by induced draft obtained by the use of 14-foot fans.
Three Cahall water-tube boilers of 400 h.p. each.
Eight Heine water-tube boilers of 400 h.p. each, equipped with Green traveling grates.
The Aultman-Taylor Company has 16 B. & W. type water-tube boilers of 450 h.p. each, equipped with Playford chain grates.
The Heine & Cahall boilers are also provided with induced draft by a 14-foot fan.
The following boilers have natural draft and are hand fired: Two Climax water tube boilers, one of 350 and one of 450 h.p. Three DuLauney, Belville type, 500 h.p. boilers (from France). One 500 h.p. Doebr water-tube boiler (from Germany). Two Niclaus boilers of 350 h.p. each made by the Stirling Boiler Company.

All the boilers have the coal supplied to and the ashes taken away by the Link Belt Machinery System of Conveyors.

In the Boiler House are 14 Worthington Underwriters’ Fire Pumps of 1000 gallons capacity each, which are capable of supplying the entire grounds by special pipe system with water at 300 pounds pressure.
DIVISION II.

Engineering Guide
TO
St. Louis and Vicinity.

Committee:
A. S. LANGSDORF, CHAIRMAN.
W. H. BRYAN.
H. A. WHEELER.

DIVISION IV.

Ninth Annual Bulletin
OF THE
Engineers' Club
OF
St. Louis.

Reports of Officers and Committees.
List of Officers and Members.
Constitution, By-Laws and Reports.

Library, Reading and Meeting Rooms,
Fourth Floor, Holland Annex,
709 Pine Street.

Office of Secretary, - - - Washington University.
Office of Treasurer, - - - 77 East May Street.

1904.
Wireless Telephony or Radiophone

- Music or spoken messages were transmitted from an apparatus within the Palace of Electricity to a telephone receiver out in the courtyard.
- The receiver, which was attached to nothing, when placed to the ear allowed a visitor to hear the transmission. This radiophone, invented by Alexander Graham Bell, consisted of a transmitter which transformed sound waves into light waves and a receiver which converted the light waves back into sound waves.
- This technology has since developed into the radio and telephone.
Ferris Wheel

- Debuted at 1893 Chicago world’s fair
- Reconstructed in St. Louis and imploded after the fair
  - 50 cents to ride in car
  - Attendant in each car
- The Ferris Wheel from balcony of Illinois Building. Louisiana Purchase Exposition, St. Louis.
- Keystone View Co.
The New York to Saint Louis automobile parade, Louisiana Purchase Exposition
Transportation

- **Electric streetcar** – still relatively novel at the time of the Louisiana Purchase Exposition. Outside of the Palace of Electricity, an exhibit including a working electric streetcar and 1400 feet of track demonstrated the speed, acceleration, and braking capacities of this new-powered model.

- **Automobile** – Automobiles and motorcars were one of the most popular attractions of the Exposition and displayed in the Palace of Transportation.
  - The automobile display contained 140 models including those powered by gasoline, steam or electricity.

- The private automobile first made its public debut at the Louisiana Purchase Exposition and four years later the Ford Motor Company began manufacturing the Ford Model T.

- A prototype car radio was also demonstrated by inventor Lee de Forest.[28]

- **Airplane** – The 1904 World's Fair hosted the first-ever "Airship Contest".
  - The Exposition offered a grand prize of $100,000 to the airship or other flying machine with the best time through a course marked out by stationary air balloons while travelling at least 15 miles per hour. Although none were able to earn the grand prize, the contest did witness the first public dirigible flight in America as well as numerous other flights made by various airships.

- St. Louis has been nicknamed Flight City.
Transportation: Locomotive Exhibits

• An exhibit of historic locomotive engines fills part of the huge Palace of Transportation.

• A number of locomotives from 19th-century England and America were on display.
Transportation: Autobus Rides

Fairgoers travel in a World's Fair autobus

Passenger Automobile
Aviation

• Aviators vied for the Louisiana Purchase Exposition’s Grand Prize for Aeronautic Achievement ($100,000 cash prize); nobody won.
• Aeronautic course and Balloon Barn – on plateau west of the Administration Bldg., adjoining Station No. 4 of the Intramural Railway
• Mr. Lincoln Beachey in Thomas Scott Baldwin's airship at the St. Louis Expo, 1904
• Airship "De La Muerthe" in Transportation Building, St. Louis Expo, 1904
• Wright Brothers, Kitty Hawk, Dec. 1903
Palace of Machinery

- A view of the Allis-Chalmers exhibit in the Palace of Machinery shows exhibits from companies
  - Jeanesville Iron Works
  - Crocker-Wheeler
  - Doble Abner
  - Harrisburg Foundry
  - General Electric
  - Westinghouse
Pike – East Entrance

- Statue *Cowboys Shooting Up a Western Town*, by Frederic Remington, at left center; Akoun's Mysterious Asia attraction in the left background; and the Under and Over the Sea attraction on the right.

- Mysterious Asia was a representation of life in India, Burma, Persia, and Ceylon, and required a 15-cent admission. Under and Over the Sea represented a trip to Paris in a submarine and a return in an airship, and required a 50-cent admission.
Incubator Babies: A Pike Main Attraction

- “Human Hatchlings”
- The exhibit was patterned after Couney's sideshows at the Omaha Trans-Mississippi Exposition of 1898 and the Buffalo Pan-American Exposition of 1901, but Couney was not involved.
- After an epidemic of diarrhea among the infants, management of the exhibit was turned over to pediatrician John Zahorsky, who later documented his experiences in a series of nine articles in the St. Louis Courier of Medicine.
- Evidently this photo was taken prior to the Zahorsky regime, as the glass partition described by Zahorsky is not present.
International Congress of Arts and Science

- Met at the St. Louis World’s Fair, 19-25 Sept. 1904
- “The sections in technology, including the various branches of engineering, technical chemistry and agriculture, were conducted by prominent Americans, although the interest in this part of the program was scarcely commensurate with its importance.”
- Officers and speakers included:
  - President Humphreys, of Stevens Institute
  - Professor Arthur Kennelly of Harvard
  - Mr. John Hammond of New York
  - Professor Liberty H. Bailey of Cornell
  - Hon. James Wilson, Secretary of Agriculture
- The Eighth International Geographic Congress met with the Internal Congress of Arts and Science
International Electrical Congresses

- **International Electrical Congress**
  - 1881 in Paris in connection with International Exposition of Electricity
  - 1893 in Chicago at the World’s Columbian Exposition
  - 1900 in Paris at the Paris Exposition Universelle
  - **1904 in St. Louis at the Louisiana Purchase Exposition**

- **Other events were held, sometimes in preparation to the official congresses**
  - **Concurrent Related Congresses**
    - 1882, 1884, and 1889 in Paris
    - 1891 in Frankfurt
    - 1892 in Edinburgh
    - 1896 in Geneva

- **International Electrotechnical Congress**
  - 1908 in London
  - 1911 in Turin
  - 1915 in San Francisco

- **Related International Electrotechnical Conferences**
  - 1905 in Berlin
  - 1908 in Marseille

- **Series of international meetings, from 1881 - 1904, in the then new field of applied electricity**
  - The first meeting was initiated by the French government, including official national representatives, leading scientists, and others.
  - Subsequent meetings also included official representatives, leading scientists, and others.
  - Primary aims were to develop reliable standards, both in relation to electrical units and electrical apparatus.

- **St. Louis, 1904**
  - Recommended two permanent international commissions, one about electrical units and standards, the other about unification of nomenclature and characteristics of electrical machines and apparatus.
  - These recommendations are considered the seed that initiated the creation of the International Electrotechnical Commission in 1906
IEEE Foundation
International Electrical Congress: Government Delegates
Delegates to the International Electrical Congress from these Technical and Scientific Societies

- Royal Society of London
- Royal Society of Canada
- The American Physical Society
- The Institute of Electrical Engineers
- The American Institute of Electrical Engineers
- La Societe Internationale des Electriciens
- Oesterreicher Elektrotechnischer Verein
- Royal Institution of Netherland Engineers
- Associazione Elettrotecnica Italiana
- The American Electrochemical Society
- The National Electric Light Association
- The Association of Edison Illuminating Companies
- The Pacific Coast Transmission Association
- The Northwestern Electrical Association
- The International Association of Municipal Electricians
- The American Electrotherapeutic Association
International Electrical Congress
The Congress met in St. Louis for five days, 12-17 Sept. 1904

Registrants = 719

Papers Read = 158

- 99 in printed form and distributed at the meeting (the remainder received too late for printing)
IEE’S Gift to the AIEE

- William Gilbert demonstrating his experiments before Queen Elizabeth I, by A. Auckland Hunt
AIEE’s Thank you to the Institute of Electrical Engineers for its “Generous and Thoughtful Gift”

› “Many evidences of friendship and good will from the officers and members of your body during their recent visit, as our official guests, to the International Electrical Congress of St. Louis, 1904.”

› IEEE President Robert Kay Gray, gifted painting to AIEE on 17 Sept. 1904
  - “[T]he magnificent painting representing Dr. William Gilbert of Colchester before Queen Elizabeth”
  - “The masterly representation of an historic scene will be cherished by us as a testimonial of the...ties [that] binds our Institute with the elder Institution of the mother country.”
  - “The painting will be displayed in a prominent position in our new headquarters in the United Engineering Building.”
  - Signed by AIEE President, J.W. Lieb, Jr. and Secretary, Ralph W. Pope
Gift from the Italian Government and Electrical Engineers

- Why do you find this gentleman’s bust at 445 Hoes Lane, Piscataway, NJ?
- Galileo Ferraris (31 October 1847 – 7 February 1897)
- Italian university professor, physicist and electrical engineer
- Pioneer of AC power system
- Inventor of the induction motor (published paper in March 1888, but did not patent)
- In 1896, Ferraris joined the Italian Electrotechnical Association and became the first national president of the organization
IEEE Milestone #211: Rotating Fields and Early Induction Motors, 1885-1888

- Citation: Galileo Ferraris, professor at the Italian Industrial Museum (now Polytechnic) of Turin, conceived and demonstrated the principle of the rotating magnetic field. Ferraris' field, produced by two stationary coils with perpendicular axes, was driven by alternating currents phase-shifted by 90 degrees. Ferraris also constructed prototypes of two-phase AC motors. Rotating fields, polyphase currents, and their application to induction motors had a fundamental role in the electrification of the world.

- Achievement date range: 1885-1888
- Region 8; Italy Section
- Dedicated: 21 Jan. 2021
- Location: Torino, Italy
Pittsburg, Pennsylvania

- 18 Sept., arrive at 3 p.m.
- Hotel Schenley, built in 1898, is the local headquarters
  - Later, the William Pitt Union building of the University of Pittsburgh
- 19 Sept., special trolley to Westinghouse Electric & Mfg. Co., East Pittsburg
  - Tour the Westinghouse works
  - Lunch at company
  - Afternoon visit foundries of Westinghouse Airbrake Co.
- 9:30 p.m. special train on Pennsylvania Railroad to Washington, D.C. (overnight train, arriving in Washington, D.C. at 7:30 a.m.)
Westinghouse Works, East Pittsburg, PA, ca. 1904

• Pittsburg, “The World’s Work Shop”
• “It is the hub on which the wheel of American Industries has been wrought, and each spoke in this wheel represents a magnificent activity who distinctive greatness may be approached, but is not surpassed anywhere.” (p. 15)
• Westinghouse Industries including:
  • Westinghouse Electric & Mfg. Co.
  • Nernst Lamp Co.
  • Pittsburg Meter Co.
  • Iron and steel manufacturing
  • Carnegie Institute
  • Allegheny Observatory
Pennsylvania Railroad: Pittsburg to Washington, D.C.
Willard Hotel, Washington, D.C.

- Lobby, ca. 1901-1910
- Dining Room, ca. 1901-1910
Bellevue-Stratford Hotel, Philadelphia, ca. 1900 - 1910
Additional Sources:

Primary and Secondary – Print, Visual, and Audio
AIEE Electrical Handbooks for 1904 St. Louis World's Fair
https://ethw.org/Archives:AIEE_Electrical_Handbooks_for_1904_St._Louis_World%27s_Fair

1. Boston Electrical Handbook
3. Schenectady Electrical Handbook
5. Niagara Falls Electrical Handbook
6. Chicago Electrical Handbook
7. St. Louis Electrical Handbook

- **Related publications**
  - Engineers Club St Louis - World's Fair Souvenir 1904
  - International Electrical Congress, Nature, Nov 10, 1904
  - St Louis International Electrical Congress, Nature, Oct 27, 1904
  - 1904 - Transactions, International Electrical Congress, V1
  - 1904 - Transactions, International Electrical Congress, v2
  - 1904 - Transactions, International Electrical Congress, v3
  - AEIC - Edisonia, 1904
Secondary Sources: many books and articles

Digitized Primary Resources Include:
  https://library.si.edu/digital-library/collection/worlds-fairs
  - Digitized by an outside vendor
  - World's Columbian Exposition (1893: Chicago, Ill.) Electrical Industries Pub. Co, 1893
  - Memories of the world's greatest exposition, St. Louis, 1904. James Bayne Co. J. Bayne Company, [Grand Rapids, 1904]
- Library of Congress
- Internet Archives
- Google books
Library of Congress

- Search: St. Louis Exposition – Print, Photo, Film, Book, Audio Recording, etc.
  
  https://www.loc.gov/search/?in=&q=St.+Louis+Exposition&new=true&st=

- Films:
The Louisiana Purchase Exposition was held in St. Louis, Missouri, from May 1 to December 1, 1904, to commemorate the purchase from France of the Louisiana Territory. Preliminary steps toward the organization of the celebration were taken by the Missouri State Historical Society and the Louisiana Purchase Exposition Co. by an act of March 3, 1901, Congress appropriated $5,000,000 toward the celebration and authorized the creation of the Louisiana Purchase Exposition Commission, members of which were to be appointed by the President. At that time, it was planned that the dedication of the exposition buildings would take place not later than April 30, 1903. However, the dedication did not take place until a year later. Government exhibits were under the supervision of the U.S. Government Board, on which the State Department was represented. The Department transmitted, on August 22, 1901, invitations for other governments to participate in the exposition.

ITEMS in collections include Commemorative Medals, Diplomas, Correspondence, Letters, Telegrams, Plans (nothing is digitized)
Smithsonian Libraries – Partially digitized

Bird’s Eye View of Fair Grounds
Thank you!

Mary Ann Hellrigel, m.c.hellrigel@ieee.org