

E. S. M. /  
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FILE

FORTY-FOURTH  
Summer  
Convention

OF THE  
AMERICAN  
INSTITUTE of  
ELECTRICAL  
ENGINEERS

1884



1928

*Program*

COSMOPOLITAN HOTEL  
DENVER, COLORADO  
*June 25-29, 1928*

## CONDENSED PROGRAM

### Monday, June 25

- 10:00 a.m. Conferences (all day) of Officers and Delegates  
8:00 p.m. Reception

### Tuesday, June 26

- 9:30 a.m. Annual Business Meeting  
*Reports, Prize Presentations, Presidential Address, etc.*  
10:30 a.m. Technical Session  
1:00 p.m. Golf, Tennis, etc.  
8:30 p.m. Lecture  
9:30 p.m. Reception

### Wednesday, June 27

- 9:30 a.m. Technical Sessions  
12:30 p.m. Directors' Luncheon-Meeting  
2:00 p.m. Technical Session  
7:00 p.m. Dinner, Followed by Dancing

### Thursday, June 28

- 8:30 a.m. Mountain Trip  
7:15 p.m. Theater Party

### Friday, June 29

- 9:30 a.m. Technical Sessions  
1:00 p.m. Golf, Tennis, etc.

## CONDENSED PROGRAM (*Ladies*)

### Monday, June 25

Morning Registration  
8:00 p.m. Reception

### Tuesday, June 26

9:00 a.m. Golf  
10:00 a.m. Tennis and Swimming  
2:00 p.m. Drive and Tea  
8:30 p.m. Lecture  
9:30 p.m. Reception

### Wednesday, June 27

11:00 a.m. Drive and Bridge  
7:00 p.m. Dinner, Followed by Dancing

### Thursday, June 28

8:30 a.m. Mountain Trip  
7:15 p.m. Theater Party

### Friday, June 29

Open for Shopping, etc.



## A. I. E. E. Summer Convention



INFORMATION on all features of the Convention may be obtained at the convention headquarters on the mezzanine floor of the Cosmopolitan Hotel. Information on the ladies' entertainment is given on page 15.

### **Register Promptly**

All members and guests should register promptly after arrival at hotel for all events in which they will participate such as sports, trips and dinner-dance.

### **Annual Business Meeting of the Institute**

The Annual Business Meeting of the Institute will be held on the morning of Tuesday, June 26, in the Hall of Colorado of the Cosmopolitan Hotel. The meeting will start at 9:30 a.m. and after its completion the other events as shown in the program for Tuesday morning will follow.

All members should be present at this meeting.

### **TECHNICAL FEATURES**

The accompanying program gives a schedule of the technical sessions and the papers and reports that will be presented.

An outstanding feature will be the lecture by Dr. C. A. Heiland, Colorado School of Mines, his subject being, "Geophysical Methods of Prospecting." This lecture will be given on Tuesday evening, June 26, at 8:30 in the Hall of Colorado. A special invitation is extended to the ladies to attend this lecture.

### **Inspection Trips**

Trips may be made to the Valmont Steam Plant of the Colorado Public Service Company, Broadcasting Station KOA, stockyards and packing plants and other interesting points. Also numerous sightseeing trips may be taken as indicated elsewhere in this program.

### **Conferences of Officers and Delegates**

All day of Monday, June 25, will be devoted to conferences of Institute officers and delegates held under the auspices of the Committees on Sections and Branches. These conferences will start at 10:00 a.m. in the Hall of Colorado.

All members of the Institute are invited to the conferences.

### **Presentation of Prizes**

The Institute's national prizes for the best papers presented during 1927 will be conferred on the winners in the session on Tuesday morning, June 26.

## **SOCIAL FEATURES**

At 8 o'clock Monday evening, June 25, an informal reception and general get-acquainted meeting will be held on the mezzanine floor.

### **Reception**

A reception is scheduled for Tuesday evening, at 9:30 in the Hall of Colorado. It will be informal and will be followed by dancing.

## **Dinner**

On Wednesday evening, at 7 o'clock, a convention dinner-dance will be held in the Hall of Colorado. Herbert S. Sands, Chairman of the General Convention Committee will act as Chairman. J. F. Greenawalt will be the Toastmaster. Addresses will be made by Tyson S. Dines, Director of the United States Chamber of Commerce and President of the Denver Chamber of Commerce, and by Dr. Archer B. Hulbert, of Colorado College. Mr. Dines' subject will be announced at the dinner. Dr. Hulbert's subject is "The Relation of Frontiering to Civilization." Tickets should be obtained at the registration desk where reservations for seating may be made.

## **Mountain Trip**

On Thursday, June 28, the visitors will enjoy an all-day mountain trip, starting at 8:30 a.m. Denver's Mountain Parks are famous for their beautiful drives and incomparable scenic attractions. From the high points along the way one hundred and fifty miles of the main range of the Rockies will be in view. At least thirty named peaks, with their crests of perpetual snow will be seen. A halt will be made on Lookout Mountain at the grave of Col. William F. Cody, generally known as "Buffalo Bill." A visit will be made to Pahaska Tepee, which contains a museum of relics of the famous scout.

The trip will end at the Cosmopolitan Hotel about 4:30.



## **Theater Party**

On Thursday evening, at 7:15, members and guests will entrain on special tramway cars in front of the Cosmopolitan Hotel for a theater party at Elitch's Gardens. This is a unique old theater located in a beautiful garden setting. The performance "The Outsider" will be played by a cast of well known actors.

## **SPORTS**

Golf, tennis and swimming may be enjoyed on every day of the convention. Those who will enter the tournaments should register at the earliest possible time.

### **Golf**

There will be a golf tournament on Tuesday, June 26, at the Lakewood Country Club. This will be the 14th annual competition for the Ralph D. Mershon Cup, participation in which is limited to members of the Institute. This cup was donated by Past-President Ralph D. Mershon, and in the event any member wins it twice, it becomes the permanent property of that member. Competition for the cup will be by medal play with full handicap as submitted equalized to the course par. This trophy is awarded to the player making the low net score.

Prizes will also be awarded to the second low net score. All ties will be played off in nine holes of medal play with full handicap as applied to the first nine holes.

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There will also be a "Kicker's Handicap," in which the contestant may select in advance of play any handicap he desires, with par to be drawn blind between 70 and 80, and the handicap to be deducted from the gross score. The winner will be the player making his net score equal to or closest to the blind par as drawn.

Additional prizes will be given for the best match play against par, second-best match play against par, low gross score, and the worst gross score. In the event of ties, players will cut for these prizes. Only one prize will be awarded to any individual competitor.

Players will signify their intention to play on the form supplied at time of registering at the Registration Desk. Each player will give his club handicap and the par of his home course; also, the handicap he selects for the "Kicker's Handicap."

Courtesy cars will provide transportation between the hotel and Lakewood.

Green fees of \$2.50 will be payable in advance at the Lakewood Country Club. The same green-fee courtesies will be extended to members during the other days of the convention (wear your badge).

Each player shall keep his own score, cards to be attested by partner and show the player's name legibly, and be turned in to the official scorer at the club house on completion of play. All tournaments will be played under United States Golf Association Rules and local ground rules of Lakewood Country Club.



## **Tennis**

The chief tennis play will be for the Ralph D. Mershon Tennis Cup, established in 1923, as an annual trophy. This cup is to become the property of the Institute member winning it twice. The tournament will be started on Tuesday afternoon. Finals will be played on Friday.

Transportation will be furnished and arrangements should be made at the registration desk.

Events will include men's singles and men's doubles, all matches being at scratch, and under U. S. Tennis Association Tournament Rules. Matches will be best two of three sets, including finals. Competition will be limited to members.

Entries will be taken care of at the Registration Desk. There will be prizes for winners and runners-up. Courts not in use for tournament play will be open from 1 to 5 during the convention to members and guests.

## **Interesting Points In Denver**

Below are listed some places which visitors to Denver always find of unusual interest:

The State Capitol, in a commanding location overlooking the Civic Center. Built of Colorado gray granite; interior finished with Colorado onyx and solid bronze.

South of the Capitol across Fourteenth avenue is the State Museum, containing finest collection of Cliff Dwellers' relics in the world; also, extensive Indian collection.

In the City Park is located the Colorado Museum of Natural History, with a wonderful display of birds and animal life, and a display of mineral exhibits unsurpassed in the country.

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In City Park also are located the Thatcher Fountain, a piece of sculpture of unusual artistic appeal, and the monument of Robert Burns.

The Civic Center across Broadway from the capitol grounds contains several objects of architectural and sculptural excellence, the Voorhees Gate on the North and on the South the Greek Theater. Near the theater is a striking bronze figure, the Bucking Broncho.

In Cheesman Park stands the Cheesman Memorial, a replica in pretentious proportions of a Grecian Temple, of Colorado white marble.

Lovers of the beautiful in art will wish to see Denver's art center, the Denver Art Museum, Chappell House. It contains collections of bronze and marble art objects, rare paintings, prints, etchings, etc.

### **Tours Following Convention**

In connection with the convention a most attractive tour of Yellowstone Park and other places has been arranged to start immediately after the convention closes, June 29.

Other enjoyable scenic trips may be taken out of Denver. Probably some who will not take the Yellowstone tour will take some of the other trips after the convention closes. The regular summer excursion rates from points east of the Missouri River include a free side trip to Colorado Springs, the center of the Pike's Peak region, or to Boulder, the gateway to the Glacier district.

Popular Colorado side trips may be as follows:

One-day trips through Boulder and the Glacier Region for \$6.80 and \$9.50.

One-day trip through the Moffat Tunnel, \$6.50

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Two-day all-expense auto tour through Rocky Mountain National Park, Big Thompson Canyon and Lookout Mountain, \$33.00.

Three-day all-expense auto tour as above except an extra night spent at Grand Lake, \$39.00.

Attendants will be present at the Cosmopolitan Hotel Headquarters so that reservations and travel information may be available.

### **Presentation and Discussion of Papers**

At the technical sessions papers will be presented in abstract, ten minutes being allowed for each paper.

Any member is free to discuss any paper when the meeting is thrown open for general discussion. The discussion of a member on any paper or any group of similar papers will be limited to 3 minutes or 5 minutes, depending on conditions.

It is preferable that a member who wishes to discuss a paper give his name beforehand to the registration bureau or to the presiding officer of the session at which the paper is to be presented.

Each discussor should step to the front of the room and announce, *so that all may hear*, his name and professional affiliations.

Written discussion should be left with the reporter after it is presented.



## PROGRAM

(Ladies' Program is on Page 15)

All meetings will be held in the Hall of Colorado unless otherwise indicated.

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### MONDAY, JUNE 25

- 9:00 a.m. Registration
- 10:00 a.m. Conference of Officers and Delegates  
Under auspices of Committees on Sections and Branches
- 12:30 p.m. Section and Branch Delegates'  
Luncheon (Main Dining Room)
- 2:00 p.m. Conference of Officers and Delegates  
(Continued)
- 8:00 p.m. Informal Reception (Mezzanine Floor)

**TUESDAY, JUNE 26**

**9:00 a.m. Registration**

**9:30 a.m. Annual Business Meeting of the  
Institute**

Address of Welcome by Hon. B. F. Stapleton,  
Mayor of Denver

Annual Report of Board of Directors (Abstract),  
F. L. Hutchinson, National Secretary

Report of Tellers' Committee on

(a) Election of Officers

(b) Constitutional Amendments

Presentation of Prizes for Papers

Presidential Address by Bancroft Gherardi

**10:30 a.m. Technical Session (A) on Surge-Voltage  
Investigations**

*Surge-Voltage Investigation on Transmission Lines,*  
W. W. Lewis, General Electric Co.

*Lightning Investigations on New England Power Com-  
pany's System,* E. W. Dillard, New England Power Co.

*Surge-Voltage Investigation on 140-kv. System of Con-  
sumers Power Co.,* J. G. Hemstreet and J. R. Eaton,  
Consumers Power Co.

*Surge-Voltage Investigation on 132-kv. Transmission  
Lines of American Gas and Electric Co.,* Philip Sporn,  
American Gas & Electric Co.

*Surge-Voltage Investigation on 220-kv. System of Penn-  
sylvania Power & Light Co.,* N. N. Smeloff, Penn-  
sylvania Power & Light Co.

**1:00 p.m. Golf and Tennis Tournaments**

**8:30 p.m. Lecture, *Geophysical Methods of Pros-  
pecting***

Dr. C. A. Heiland, Colorado School of Mines.

**9:30 p.m. Reception**

*A. I. E. E. Convention—Program*

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**WEDNESDAY, JUNE 27**

**9:30 a.m. Technical Committee Reports,  
Sessions B and C**

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SESSION B (Hall of Colorado)

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- Research*, F. W. Peek, Jr., Chairman  
*Electrophysics*, Vladimir Karapetoff, Chairman  
*Instruments and Measurements*, E. S. Lee, Chairman  
*Communication*, H. W. Drake, Chairman  
*Production and Application of Light*,  
P. S. Millar, Chairman  
*Electrochemistry and Electrometallurgy*,  
G. W. Vinal, Chairman  
*Electrical Machinery*, F. D. Newbury, Chairman

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SESSION C ((Banquet Room)

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- Power Transmission and Distribution*,  
Philip Torchio, Chairman  
*Protective Devices*, F. L. Hunt, Chairman  
*Automatic Stations*, Chester Lichtenberg, Chairman  
*General Power Application*,  
A. M. MacCutcheon, Chairman  
*Applications to Mining Work*, W. H. Lesser, Chairman  
*Applications to Marine Work*, W. E. Thau, Chairman  
*Transportation*, J. V. B. Duer, Chairman  
*Electric Welding*, J. C. Lincoln, Chairman



A. I. E. E. Convention—Program

Wednesday, June 27, (Continued)

12:30 p.m. Directors' Luncheon-Meeting

2:00 p.m. Technical Session (D) on Electrified  
Railways

*High-Speed Circuit Breakers*, J. W. McNairy, General  
Electric Co.

*High-Speed Circuit Breakers for Railway Electrification*,  
H. M. Wilcox, Westinghouse Electric & Mfg. Co.

*Operating Experience with High-Speed Circuit Breakers*,  
B. F. Bardo, New York, New Haven & Hartford  
Railroad.

*Arrangement of Feeders and Equipment for Electrified  
Railways*, R. B. Morton, of Gibbs and Hill.

*Protection of Electric Locomotives and Cars to Operate  
with High-Speed Circuit Breakers*, E. H. Brown, Penn-  
sylvania Railroad.

*The High-Speed Circuit Breaker in Railway Service*,  
W. P. Monroe and R. M. Allen, Illinois Central  
Railroad.

7:00 p.m. Convention Dinner,  
Followed by Dancing

THURSDAY, JUNE 28

8:30 a.m. Mountain Trip  
Returning about 4:30 p.m.

7:15 p.m. Theater Party

*A. I. E. E. Convention—Program*

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**FRIDAY, JUNE 29**

**9:30 a.m. Technical Sessions E and F**

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SESSION E (Banquet Room)

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*A Formula for Minimum Horizontal Spacing of Transmission-Line Conductors*, P. H. Thomas, Consulting Engineer.

*Transmission Experiences of the Public Service Co. of Colorado*, M. S. Coover, University of Colorado, and W. D. Hardaway, Public Service Co. of Colorado.

*A-C. Elevator Motors of the Squirrel-Cage Type*, R. E. Dreese, Lincoln Electric So.

*Electric Welding of Pipe Lines*, J. D. Wright General Electric Co.

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SESSION F (Hall of Colorado)

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*Utilization of Lodgepole Pine as Pole Timber*, R. W. Lindsay, Mountain States Telephone & Telegraph Co.

*Carrier Systems on Long Distance Telephone Lines*, H. A. Affel and C. S. Demarest, American Telephone & Telegraph Co., and C. W. Green, Bell Telephone Laboratories, Inc.

*Superimposed High-Frequency Currents for Circuit Breaker Control*, L. R. Ludwig, Westinghouse Electric & Mfg. Co.

*Extinction of an Alternating-Current Arc*, Joseph Slepian, Westinghouse Electric & Mfg. Co.

**1:00 p.m. Golf and Tennis Finals**

**7:20 p.m. Train leaves for Tour to Yellowstone Park, etc.**

## LADIES' ENTERTAINMENT

The ladies' headquarters will be on the mezzanine floor, where members of the local reception committee will be present to assist in every way possible. Definite instructions will be given each day also from the bulletin board at the Registration Desk.

All ladies, whether local or from out of town, are asked to register as early as possible and signify their intention of attending sports or other functions. Those entering the golf or tennis tournaments must play both Tuesday morning and Friday morning to be eligible for the prizes. Swimming stunts for prizes will be held Tuesday morning, in the Denver Athletic Club. The pool will also be available for any who care to swim on Friday morning.

Prizes for different events will be found on display on the mezzanine floor near the registration booth.

### Ladies' Program

#### MONDAY, JUNE 25

8:00 p.m. Informal Reception on the Mezzanine Floor.

#### TUESDAY, JUNE 26

9:00 a.m. Golf and Putting Contests at Lakewood Country Club

Cars will leave the hotel at 8:30

10:00 a.m. Tennis Match

Cars will leave the hotel at 9:30 a.m.



## A. I. E. E. Convention—Program

**10:00 a.m. Swimming and Stunts at the Denver Athletic Club**

Glenarm Street, between 13th and 14th Streets, walking distance. Cars available if desired. (Participants should furnish their own bathing suits.)

**2:00 p.m. Drive About Denver**

Followed by a Tea and Entertainment at Cherry Hills Country Club.

**8:30 p.m. Lecture on Geophysics**

By Dr. C. A. Heiland, Colorado School of Mines.

**9:30 p.m. Reception and Dance**

### WEDNESDAY, JUNE 27

**11:00 a.m. The Ladies will congregate on the mezzanine floor for a Drive up Lookout Mountain for Luncheon and Bridge at the Mt. Vernon Country Club.**

In addition to the Bridge prizes, there will be a Free-For-All prize, for which all ladies attending are eligible to draw. The return drive will be through Mt. Vernon Canyon, for which cars will be in readiness at 4:30.

**7:00 p.m. Dinner, followed by Dancing**

### THURSDAY, JUNE 28

**8:30 a.m. All-Day Mountain Trip**

Described elsewhere in this program.

**7:15 p.m. Theater Party at Elitch's Gardens**

Elitch's is far-famed for its beauty and the excellence of its theatrical performances.

### FRIDAY, JUNE 29

Left open for shopping, for which the information booth will be glad to furnish guides. There will be cars available for those desiring trips about the city.

**7:20 p.m. Train Leaves for Tour to Yellowstone Park**

## A. I. E. E. Summer Convention

### GENERAL CONVENTION COMMITTEE

The General Convention Committee consists of the following general officers and the chairmen and vice-chairmen of the various other committees as indicated below. Each of these other committees in turn includes a number of members associated with the officers shown.

O. J. FERGUSON, *Vice-President, District No. 6*  
H. S. SANDS, *Chairman*  
W. H. EDMUNDS, *Vice-Chairman*  
R. B. BONNEY, *Secretary*

#### Entertainment

B. SHUBART, *Chairman*  
H. B. DWIGHT, *Vice-Chairman*

#### Finance

W. C. STERNE, *Chairman*  
G. E. MCCARN, *Vice-Chairman*

#### Meetings and Papers

H. P. CHARLESWORTH, *Chairman*  
L. N. MCCLELLAN, *Vice-Chairman*

#### Registration

A. L. JONES, *Chairman*  
W. C. DUVALL, *Vice-Chairman*

#### Sections

W. B. KOUWENHOVEN, *Chairman*  
V. L. BOARD, *Vice-Chairman*

#### Ladies Entertainment

MRS. A. L. JONES, *Chairman*  
MRS. L. N. MCCLELLAN, *Vice-Chairman*

#### Hotel

H. B. BARNES, *Chairman*  
J. H. MCCABE, *Vice-Chairman*

#### Publicity

J. F. GREENAWALT, *Chairman*  
H. H. ARGABRITE, *Vice-Chairman*

#### Transportation

W. H. EDMUNDS, *Chairman*  
G. M. MOORE, *Vice-Chairman*

#### Student Branches

J. L. BEAVER, *Chairman*  
H. S. EVANS, *Vice-Chairman*

### Ladies' Committees

The Ladies' Committees consist of the officers as indicated below and a group of associates on each Committee.

#### General Entertainment Committee

MRS. A. L. JONES, *Chairman*  
MRS. L. N. MCCLELLAN, *Vice-Chairman*

#### Reception Committee

MRS. BENEDICT SHUBART, *Chairman*  
MRS. C. E. DRENNEN, *Vice-Chairman*  
MRS. H. B. BARNES, *Second Vice-Chairman*

#### Tea Committee

MRS. H. S. SANDS, *Chairman*  
MRS. L. M. CARGO, *Vice-Chairman*

#### Bridge Committee

MRS. FRANK O'RYAN, *Chairman*  
MRS. F. H. REID, *Vice-Chairman*

#### Dancing Committee

MRS. H. H. KEEL, *Chairman*  
MRS. J. S. VEATCH, *Vice-Chairman*

#### Golf Committee

MRS. W. TRUDGIAN, *Chairman*  
MRS. W. H. BULLOCK, *Vice-Chairman*

#### Tennis Committee

MRS. L. M. ROBERTSON, *Chairman*  
MRS. M. S. COOPER, *Vice-Chairman*

#### Swimming Committee

MRS. H. L. VAUGHN, *Chairman*  
MRS. C. M. DAY, *Vice-Chairman*



## Officers of A.I.E.E. 1927 - 1928

**PRESIDENT**  
Bancroft Gherardi

### JUNIOR PAST PRESIDENTS

C. C. Chesney M. I. Pupin

### VICE-PRESIDENTS

H. M. Hobart O. J. Ferguson  
B. G. Jamieson E. R. Northmore  
George L. Knight J. L. Beaver  
H. H. Schoolfield A. B. Cooper  
A. E. Bettis C. O. Bickelhaupt

### MANAGERS

John B. Whitehead I. E. Moulthrop  
J. M. Bryant H. C. Don Carlos  
E. B. Merriam F. J. Chesterman  
M. M. Fowler F. C. Hanker  
H. A. Kidder E. B. Meyer  
E. C. Stone H. P. Liversidge

### NATIONAL TREASURER

George A. Hamilton

### NATIONAL SECRETARY

F. L. Hutchinson

### HONORARY SECRETARY

Ralph W. Pope

## A.I.E.E. Meetings and Papers Committee

H. P. Charlesworth, *Chairman*

E. H. Hubert, *Secretary*

H. W. Drake J. E. Macdonald  
J. V. B. Duer E. B. Meyer  
W. S. Gorsuch P. S. Millar  
F. L. Hunt L. W. W. Morrow  
V. Karapetoff F. D. Newbury  
G. L. Knight H. S. Osborne  
A. E. Knowlton F. W. Peek, Jr.  
E. S. Lee A. G. Pierce  
W. H. Lesser C. E. Skinner  
Chester Lichtenberg W. E. Thau  
J. C. Lincoln Philip Torchio  
P. M. Lincoln G. W. Vinal  
A. M. MacCutcheon T. A. Worcester