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TRANSACTIONS
OF THE
AMERICAN SOCIETY
OF
MECHANICAL ENGINEERS.
VOL. XIX.

XXXVITH MEETING, NEW YORK, 1897.

XXXVIIITH MEETING, NIAGARA FALLS, N. Y., 1898.



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PAPERS
OF THE
NEW YORK MEETING
(XXXVith)

NOVEMBER 30th TO DECEMBER 3d, 1897.

BEING ALSO THE EIGHTEENTH ANNUAL MEETING OF THE SOCIETY.

DCCXLIX.

PROCEEDINGS

OF THE

NEW YORK MEETING

(XXXVith)

OF THE

AMERICAN SOCIETY OF MECHANICAL ENGINEERS.

November 30th to December 3d, 1897.

THE eighteenth annual meeting of the Society (being also its thirty-sixth convention) was held in New York City during the period November 30 to December 3, 1897. The sessions for papers were convened in the auditorium of the Society's house, 12 West Thirty-first Street, and in the parlors and library adjoining the meeting hall a large number of guests and visitors was always to be found.

The opening session was called to order about nine o'clock on Tuesday evening by the Secretary of the Society, who, after a few words of greeting in the name of the New York members, read a letter just received from Mrs. R. Anna Cary, widow of the late Alanson Cary, as follows :

14 WEST 77TH STREET.

THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS,
12 West 31st Street, New York.

Gentlemen.—The portrait of Robert Fulton, painted by himself, which was loaned to you two years ago by Alanson Cary, I now wish to present to the American Society of Mechanical Engineers, in his memory, feeling that it would be his desire to have me do so.

Hoping that this gift may prove acceptable, I remain,

Very truly yours,

R. ANNA CARY.

November 30, 1897.

of the Society's *Transactions* for the year 1899, and that the issue of the volume for 1900 come under the foregoing resolution.

Resolved, That similar institutions desiring to purchase back volumes of *Transactions* to complete their sets be permitted to do so at the regular member's rates of \$5.00 in paper covers and \$6.00 per volume in the morocco binding.

At a later meeting, October, 1897 :

Resolved, That State or Public Libraries which derive their income from taxation be allowed to procure back volumes or the current and future issues at the usual rates to non-members; viz., at \$10.00 per volume in paper binding and \$11.00 per volume in half morocco.

The Council and the Society have been advised, through Mr. Wm. J. Hammer, President of the International Conference on Standard Electrical Rules, that the conference and the other societies which were contributory to the conference have accepted the proposed standard, of which copies have been furnished to us for limited distribution to those interested. The conference requests that this Society will take the usual action which is customary in such cases, and the Council have directed that the communication of Mr. Hammer should be read at the annual meeting, and the report of Mr. C. J. H. Woodbury, member of the Society, as a delegate to represent the Society at the conference, and on whom was conferred the honor of being made its secretary, should be made matters of business for the annual meeting.

Pursuant to the provisions of an agreement entered into between the Society and Mr. Oberlin Smith, the Society has become the owner, by assignment, of the design patent taken out by Mr. Oberlin Smith for the oval form of the standard decimal gauge for measuring and indicating the thickness of metals, sheet and wire, by thousandths of an inch, the number of thousandths being the number of the notch in the edge of the oval gauge. It is not the intention of the Society to derive any business advantage from the ownership of this patent, but merely to protect the decimal gauge from abuse in unauthorized hands. In carrying out this purpose the Society has given manufacturer's license to the firm of Pratt & Whitney of Hartford, Conn., and will be glad to make a similar arrangement, upon request, with other firms of good standing.

It has been found to be of sufficient advantage to the Society and the profession of mechanical engineering in America to have the Society officially represented in the conferences which occur at stated intervals to discuss uniform methods of test and test-

Resolved, That the heartfelt thanks of the members in attendance at this conference are due, and are hereby tendered, to the New York members of the Society for their generous hospitality in entertaining their guests at the general conference held last evening.

C. J. H. Woodbury.—In rising to second this resolution I wish to say that it has always seemed to me that members of the Society are now, and have always been, deeply grateful to the New York members of the Society for the perennial spring of hospitality which we have always found flowing in the late afternoon for our annual meeting. We non-residents may be like the little lad who was reproached for not thanking a generous woman for her gift of candy, who replied that he did thank her, but had not told her so. It may be that we have not always told the New York members of our thanks, and it seems to me a proper action to spread a resolution of this sort upon the records of our Society.

Light and humorous remarks were made by Messrs. Ashmun and Oberlin Smith, and, on motion, the resolution was adopted.

The President called on Mr. C. J. H. Woodbury, who had been appointed a delegate to represent the Society at the National Conference which had been summoned to consider the revision of rules and requirements for the installation of apparatus and wiring for electric light, heat, and power. He expressed that the Society had tendered to this Conference the use of its rooms for their meetings, and that a ballot letter of recognition had been received and filed from Mr. William J. Hambleton, the President of the Conference. Mr. C. J. H. Woodbury had been chosen the Secretary of the Conference, as well as representing the Society in its deliberation. Mr. Woodbury's report was as follows :

REPORT OF DELEGATE TO THE NATIONAL CONFERENCE ON
STANDARD ELECTRICAL RULES.

BOSTON, MASS., *October 1, 1897.*

TO THE PRESIDENT AND COUNCIL OF THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS.

Motion : In accordance with the vote of the Council :
Resolved, " That the American Society of Mechanical Engineers accept with pleasure the invitation from the National Conference on

Standard Electrical Rules, and until further action will send a delegate to future meetings of the Conference ;”

Resolved : “That Mr. C. J. H. Woodbury, of Boston, past Vice-President of this Society, be appointed the delegate of this Society to the National Conference on Standard Electrical Rules, until further action by the Council.”

The Conference included representatives from the following bodies :

American Society of Mechanical Engineers,
 American Institute of Electrical Engineers,
 American Street Railway Association,
 Associated Factory Mutual Fire Insurance Companies,
 National Association of Fire Engineers,
 National Board of Fire Underwriters,
 National Electric Light Association,
 Underwriters' National Electric Association,
 National Board of Fire Underwriters,
 American Institute of Architects,
 International Fire Chiefs' Association,
 American Bell Telephone Company,
 Western Union Telegraph Company,
 Postal Telegraph Company,
 General Electric Company,
 Westinghouse Electric and Manufacturing Company,

and held a meeting in the Hall of the American Society of Mechanical Engineers on March 18-19, 1895, at which William J. Hammer was elected President ; C. J. H. Woodbury, Secretary.

The two days were occupied in a critical discussion of electrical rules, and a record of the conclusions taken and submitted to the following Code Committee:

F. B. Crocker, Chairman, American Institute Electrical Engineers.
 William Brophy, } National Electric Light Association.
 } National Association of Fire Underwriters.
 E. A. Fitzgerald, Underwriters' National Electric Association.
 William R. Ford, American Street Railway Association.
 E. V. French, Factory Mutual Fire Insurance Companies.
 W. H. Merrill, National Board of Fire Underwriters.
 Alfred Stone, American Institute of Architects.
 W. J. Hammer, President of the Conference, *ex-officio*.

Copies of existing rules were printed in parallel columns, and four hundred and seventy-five copies sent to interested parties, with a communication from the Secretary asking for further comments and suggestions.

The replies were submitted to the Committee on Code, who held numerous meetings, and the result of their labors accepted by the members of the Conference on a letter ballot without reassembling of the body.

The Electrical Committee of the National Board of Fire Underwriters have accepted the suggestions in the identical form in which the rules are now issued by that body under the title of the "National Electrical Code," edition of 1897, and the code has also been accepted by those of the bodies constituting that organization who have held meetings at which action could have been taken on the subject. In its present form it represents a consensus of opinion by those broadly interested in every department of the subject, and its adoption by the under-

writers and other organizations has accomplished the desired purpose of the unification of rules upon the subject of installation and maintenance of electrical plant.

A copy of the rules is submitted herewith, and forms a part of this report.

Respectfully submitted,

C. J. H. WOODBURY,

Delegate from the A. S. M. E.

At the conclusion of the report Mr. H. H. Suplee presented the following resolutions, which were adopted. The Standard Rules will be made an appendix to the papers of the meeting:

Resolved, That the American Society of Mechanical Engineers have listened with interest to the report of its delegate to the National Conference on Standard Electrical Rules, and his report concerning the National Electrical Code of Rules and requirements for installation of apparatus and wiring for electric light, heat, and power.

Resolved, That the American Society of Mechanical Engineers, pursuant to its approved policy in technical matters such as are concerned in the report of its delegate, accept the report of the Committee of the National Conference, which has been presented to the Society by Mr. Woodbury, and direct that the rules and requirements recommended be printed as one of the papers of this meeting and incorporated into the volume of *Transactions*, and the use of these rules be recommended to the membership of this Society.

FIFTH SESSION. FRIDAY, DECEMBER 3D.

The papers for the morning included certain ones which had been omitted from the regular programme of the previous evening, by reason of the interest attaching to the discussion on the revision of the code of boiler trials, and included the following papers: By Ms. George W. Dickie, entitled "Auxiliary Engines and Machinery for Naval Vessels"; by Mr. George W. Bissell, entitled "A Boiler Setting"; by Mr. H. M. Norris, entitled "An Accurate Cost-keeping System"; by Mr. George Richmond, entitled "Thermodynamics Without the Calculus"; by Mr. Charles T. Main, entitled "The Valuation of Textile Manufacturing Property"; by Mr. James Hartness, entitled "Screw Die for the Turret Lathe" and "Stay-bolt Threading Device"; by Mr. C. J. H. Woodbury, entitled "Dustless Buildings"; by Mr. Andrew Fletcher, entitled "The Stevens Valve Gear for Marine Engines"; by Mr. E. H. Mumford, entitled "Machine Moulding Without Stripping Plates"; by Mr. W. B. Smith Whaley, entitled "Electricity in Cotton Mills"; by Mr. A. L. Rice, entitled "Convenient Form of Wire Testing Machine." The discussions were presented by Messrs. Suplee, Halsey, Rogers, Oberlin