

3. MEASUREMENTS AND INSTRUMENTS

A. UNITS AND STANDARDS

THE GREAT TANGENT GALVANOMETER OF THE CORNELL UNIVERSITY

William A. Anthony

Vol. iii—1886, pp. 67-69

Description of the instrument, its degree of accuracy and advantages over other absolute methods of measurement.

Discussion, pp. 70-73, by Messrs. Frank L. Pope, ——— Lain, C. O. Mailloux, ——— Young, Ralph W. Pope, and Thos. D. Lockwood.

Further details of the construction of the great tangent galvanometer. Objections to the voltmeter.

ON COMPENSATED RESISTANCE STANDARDS

Edw. L. Nichols

Vol. v—1888, pp. 295-304

Description of a compensated carbon-copper shunt, with an approximately zero temperature coefficient of resistivity. Table of temperature coefficients of various forms of carbon observed by different investigators.

Discussion, p. 304, by Messrs. S. S. Wheeler, Edw. L. Nichols and Otto A. Moses.

A SWINGING ARM GALVANOMETER

George S. Moler

Vol. v—1888, pp. 345-350

Description of a moving needle galvanometer with a current coil arranged to swing in a vertical quadrant, so as to increase the current of range. Calibration curve of a certain instrument.

THE SPIRAL COIL VOLTAMETER

Harris J. Ryan

Vol. vi—1889, pp. 322-329

Description of construction, operation and calibration of spiral coil electrode copper voltameter.

Discussion, pp. 329-334, by Messrs. Edward Weston, Elihu Thomson, C. O. Mailloux, Otto A. Moses, E. T. Birdsall and E. L. Nichols.

Reasons for unreliability of copper voltameters. Pertinent remarks on electro-plating that bear on the construction of voltameters.

PRELIMINARY REPORT OF THE STANDARD WIRING TABLE COMMITTEE

Vol. vii—1890, pp. 344-365

Standard conductivity based on Matthiessen's correct standard. Discussion of Matthiessen's standard. Resolution for the adoption of the henry as a unit of inductance.

INDUCTANCE AND ITS PROPOSED UNIT THE "HENRY"

A. E. Kennelly

Vol. viii—1891, pp. 1-18

Definition of inductance. Proposed practical unit of inductance and reasons for its adoption. Definition of time constant. Analogies between inductance and capacity. Methods of measuring inductance.

Discussion, incorporated with that of Committee's report on the proper value of the "Henry."

REPORT OF THE COMMITTEE ON THE VALUE OF THE "HENRY"

Vol. viii—1891, pp. 31-56

Discussion of report and of Kennelly's paper on "Inductance and Its Proposed Unit 'Henry,'" by Messrs. Frank B. Crocker, Cary T. Hutchinson, Geo. A. Hamilton, Thorburn Reid, A. E. Kennelly, C. O. Mailloux, Chas. P. Steinmetz, W. A. Anthony, Ralph Pope and S. S. Wheeler. Definitions of inductance. Physical significance of inductance.

AN ALTERNATE CURRENT POTENTIOMETER

Geo. S. Moler

Vol. viii—1891, pp. 324-326

Discussion of an instrument in which mean effective alternating current is adjusted to equal the given direct current by changing the brilliancy of the incandescent filament. Test of accuracy.

Discussion, pp. 327-330, by Messrs. G. W. Blodgett, Edward L. Nichols, Elihu Thomson, Edward Weston, George Forbes and John Waring.

Experience as to sensitiveness of eye to slight variation in brilliancy of incandescent filament.

REPORT OF COMMITTEE ON UNITS AND STANDARDS

Vol. viii—1891, pp. 533-534

List of new units practically needed for convenience in dealing with magnetic circuits.

Discussion, pp. 535-543, by Messrs. Carl Hering, C. O. Mailloux, Thos. D. Lockwood, A. E. Kennelly, Townsend Wolcott, W. A. Anthony, J. Stanford Brown, M. I. Pupin, Chas. P. Steinmetz and Francis B. Crocker.

RELATION BETWEEN THE ELECTROMOTIVE FORCE OF A CLARK CELL AND THE DENSITY OF THE ZINC SULPHATE SOLUTION

H. S. Carhart

Vol. ix—1892, pp. 614-617

Results of experimental investigation of the Clark cell, determining the temperature coefficient of resistance.

Discussion, p. 617, by Messrs. Thomas D. Lockwood and E. G. Willyoung.

A MODIFIED DEPRez-D'ARSONVAL GALVANOMETER

Charles D. Parkhurst

Vol. x—1893, pp. 270-286

Detailed description of modified form of D'Arsonval galvanometer using pivoted coil and mirror. Data that are necessary for substitution in the tangent galvanometer formula.

Discussion, pp. 287-296 and 489-490, by Messrs. Elmer G. Willyoung, Edward Weston, Louis Ducan, R. C. Carpenter and Charles D. Parkhurst.

Criticism of author's instrument. Discussion of the relative advantages of Aryton and Weston types of moving coils. Weights of movable system used in Weston portable d. c. instruments.

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ON THE NOTATION PROPOSED BY M. HOSPITALIER

Alexander MacFarlane

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REPORT OF COMMITTEE ON UNITS AND STANDARDS

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Discussion, by Messrs. Townsend Wolcott, C. O. Mailloux, Charles P. Steinmetz, A. E. Kennelly and C. S. Bradley.

REPORT OF COMMITTEE ON UNITS AND STANDARDS

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STANDARDIZING ELECTRICAL MEASURING INSTRUMENTS

Elmer G. Willyoung

Vol. xi—1894, pp. 476-491

General description of the potentiometer and its advantages in standardization of commercial instruments. Detailed description of a self-contained special potentiometer designed by the author.

Discussion, pp. 492-501 and 783-786, by Messrs. R. O. Heinrich, J. G. Wray, S. A. Rhodes and W. M. Stine.

Account of investigation of different forms of the Clark standard cell, indicating the probable limits of accuracy of the potentiometer method of measurement. Advantages of the Weston standard direct reading instrument. Description of a Weston potentiometer for Rayleigh's compensation method. General remarks on the standardization of commercial instruments.

ON THE UNITS OF LIGHT AND RADIATION

A. Macfarlane

Vol. xii—1895, pp. 3-8

Discussion of various light units proposed by different scientists and engineers. Definition of various units.

Discussion, pp. 8-17, by Messrs. A. E. Kennelly, Townsend Wolcott, Douglass Burnett, Clayton H. Sharp and W. M. Stine.

General remarks on lighting units.

REPORT ON PRIMARY AND SECONDARY PHOTOMETRIC STANDARD
THE ACETYLENE AND PRIMARY STANDARDS

Vol. xii—1895, pp. 500-501

STANDARDS OF LIGHT

Preliminary Report of the Sub-Committee of the Institute

Edward L. Nichols, Clayton H. Sharp, and Charles P. Matthews Vol. xiii—1896, pp. 133-198

Account of the investigations of various standards of light, giving the relative merits and characteristics of the different types of lamps and candles.

Discussion, pp. 198-205, by Messrs. Louis Duncan, J. W. Howell, E. L. Nichols, Carl Hering, C. P. Steinmetz and R. A. Fessenden

REPORT OF COMMITTEE ON UNITS AND STANDARDS, RECOMMENDING THE ADOPTION OF THE HEFNER-ALTENECK LAMP AND THE LUMMER-BRODHUN PHOTOMETER SCREEN

Vol. xiv—1897, p. 90

THE PRECISION OF ELECTRICAL ENGINEERING

Presidential Address

F. B. Crocker

Vol. xiv—1897, pp. 237-249

Part played by precision measurement and determination of electrical quantities in the development of electrical engineering.

A CAPILLARY ELECTROMETER FOR ELECTRICAL MEASUREMENTS

Charles F. Burgess

Vol. xv—1898, pp. 337-346

Theory, construction and characteristics of capillary electrometer used in measuring insulation resistance and electromotive force.

No discussion.

B. ELECTRICAL MEASUREMENTS AND INSTRUMENTS

THE COULOMB-METER, OR INSTRUMENT FOR MEASURING THE CONSUMPTION OF ELECTRICITY

Geo. Forbes

Vol. v—1888, pp. 33-39

Description of the construction of a coulomb-meter that utilizes the heating effect of the current, and can be used for either alternating current or direct current without change in calibration.

Discussion, pp. 40-63, by Messrs. Geo. Forbes, P. H. Vander Weyde, Frank L. Pope, C. O. Mailloux, S. S. Wheeler, Geo. D'Infreville, Henry Greer, Sidney F. Shelbourne, Jos. Wetzler, Elias E. Ries, Edward Weston, J. W. Howell and F. B. Crocker.

Further data on the Forbes coulomb-meter. Description of the Weston electro-magnetic mercury float coulomb-meter.

THE GEYER-BRISTOL METER FOR DIRECT AND ALTERNATING CURRENTS

William E. Geyer

Vol. vi—1889, pp. 2-6

Description of recording ammeter or voltmeter, actuated by differential expansion of compound strip and rod heated by electric current.

Discussion, pp. 6-12, by Messrs. Alfred M. Mayer, S. S. Wheeler, William E. Geyer, Carl Hering, P. H. Vander Weyde, C. O. Mailloux, F. C. Crocker, Townsend Wolcott and Otto A. Moses.

SIX YEARS' PRACTICAL EXPERIENCE WITH THE EDISON CHEMICAL METER

W. J. Jenks

Vol. vi—1889, pp. 26-57

Brief synopsis of early patents bearing on the Edison electro-chemical meter and its auxiliary appliances. Description of the construction, wiring and mode of operation of Edison meter. Analysis of errors and discussion of advantages. Review of successful achievements in practice.

Discussion, pp. 58-69, by Messrs. W. J. Jenks, C. S. Bradley, Ralph W.

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General remarks on accuracy and cost of operation of Edison meter.

TRANSFORMERS

Harris J. Ryan

Vol. vii—1890, pp. 1-19

Account of experimental investigation of the performance of a transformer, describing the methods and apparatus employed. Wave form of e. m. f.'s., load current and exciting current measured by point-by-point method. Efficiency and losses at different loads.

Discussion, pp. 19-29, by Messrs. Townsend Wolcott, H. J. Ryan, Nikola Tesla, A. E. Kennelly, William E. Geyer, Joseph Wetzler, C. O. Mailloux, E. G. Acheson and L. B. Stillwell.

Varying opinions as to cause of distortion in the exciting current wave.

ELECTRIC METERS

George W. Walker

Vol. viii—1891, pp. 351-360

Brief analytical discussion of the relative merits of Edison electrochemical meter, the Shallenberger induction watt-hour meter, the Aron ampere-hour meter, the Thomson commutator watt-hour meter and the Walker recording ammeter which photographically records the movements of the pointer of an ammeter. Statistics on early meter patents.

Discussion, pp. 361-374, by Messrs. Elihu Thomson, Geo. W. Walker, C. R. Van Trump, E. T. Birdsall, Edward Weston, C. O. Mailloux, W. A. Anthony and E. W. Rice, Jr.

Choice of suitable name for Thomson watt-hour meter. Criticisms of the Thomson and Walker meters.

NOTE ON SOME EXPERIMENTS WITH ALTERNATING CURRENTS

Louis Duncan

Vol. ix—1892, pp. 179-190

Description of apparatus for simultaneous observation of several different wave forms by the contact method.

Discussion, pp. 190-191, by Messrs. Henry S. Carhart and Edward L. Nichols.

A DYNAMO INDICATOR, OR INSTANTANEOUS CURVE-WRITING VOLTMETER

George S. Moler

Vol. ix—1892, pp. 223-226

Description of apparatus.

Discussion, pp. 227-228, by Messrs. F. B. Crocker, E. L. Nichols, Prof. ——— Roberts and C. E. Emery.

NOTES ON WIPING CONTACT METHODS FOR CURRENT AND POTENTIAL MEASUREMENTS

Benj. F. Thomas

Vol. ix—1892, pp. 263-268

Description of contact method of measuring wave form by balancing potential against battery potential.

Discussion, pp. 269-270, by Messrs. E. L. Nichols, Charles F. Scott, D. C. Jackson and H. S. Carhart.

ELECTRICAL RECORDING METERS

Caryl D. Haskins

Vol. x—1893, pp. 29-47

Brief description of the various types of meters used to measure electric service—ampere-hour meters, recording ammeters, recording watt-meters and watt-hour meters, covering chemical, recording chemical, clock work and motor meters. Shortcomings of induction meters and advantages of Thomson commutator type meter.

Discussion, pp. 48-62, by Messrs. W. D. Lockwood, Townsend Wolcott, C. D. Haskins, R. O. Heinrich, Fred W. Tischendoerfer, A. E. Kennelly, C. R. Van Trump and J. Overbury.

Description of the Teague meter and results of load tests showing losses. Accuracy of commercial watt-hour meters.

HEDGEHOG TRANSFORMER AND CONDENSERS

Frederick Bedell, K. B. Miller, and G. F. Wagner

Vol. x—1893, pp. 497-518

Description of point-by-point method of measuring wave form by means of Bedell-Ryan revolving contact maker. Complete reference covering history of development of point-by-point method. Description of Hedgehog transformer and account of performance tests made with current and e. m. f. wave meters. Study of the effect of condensers on line current.

Discussion, pp. 519-527, by Messrs. A. E. Kennelly, M. I. Pupin, Charles E. Emery, Frederick Bedell and Charles P. Steinmetz.

General remarks on performance of ordinary Hedgehog transformer. Observed dielectric hysteresis loop.

AN OPTICAL PHASE INDICATOR AND SYNCHRONIZER

George S. Moler and Frederick Bedell

Vol. xi—1894, pp. 502-506

Description of synchronism indicator.

No discussion.

A RELIABLE METHOD OF RECORDING VARIABLE CURRENT CURVES

Albert C. Crehore

Vol. xi—1894, pp. 507-521

Description of current wave tracer based on rotation of plane of polarization of monochromatic light; theory and laws.

Discussion, pp. 521-522, by Messrs. C. P. Steinmetz and William A. Anthony.

A NEW METHOD OF STUDYING THE LIGHT OF ALTERNATING ARC LAMPS

William L. Puffer

Vol. xiii—1896, pp. 71-78

Description of stroboscopic investigation of electric arcs.

No discussion.

**AN EXPERIMENTAL STUDY OF ELECTRO-MOTIVE FORCES INDUCED ON
BREAKING A CIRCUIT**

F. J. A. McKittrick, with an introduction by Dr. Edward L. Nichols

Vol. xiii—1896, pp. 245-268

Construction of high frequency galvanometer provided with mirror and photographic attachment. Description of test made with the apparatus. Reproductions of current and e. m. f. curves.

Discussion, pp. 268-269, by Messrs. W. A. Anthony, A. J. Wurts, E. L. Nichols and J. W. Howell.

C. NON-ELECTRICAL MEASUREMENTS

ELECTRIC METERING FROM THE STATION STANDPOINT

Caryl D. Haskins

Vol. xiv—1897, pp. 317-326

Discussion of qualities that a satisfactory watt-hour meter should possess. Importance of measuring constant energy output.

Discussion, pp. 326-334, by Messrs. Louis Bell, F. A. C. Perrine, R. B. Owens, C. D. Haskins, H. C. Spaulding, A. E. Childs and C. P. Steinmetz.

THE PHOTOMETRY OF THE ENCLOSED ALTERNATING ARC

Charles P. Matthews, W. H. Thompson and J. E. Hilbish

Vol. xv—1898, pp. 579-597

Description of method of photometry of arc lamps. Distribution curves for enclosed alternating and direct current arcs with different kinds of glassware. Description of mechanical device for recording voltmeter settings.

Discussion, pp. 598-609, by Messrs. L. B. Marks, W. H. Friedman, A. E. Kennelly and John Millis.

General remarks on photometry of arc lamps.

THE DETERMINATION OF THE WAVE FORM OF ALTERNATING CURRENTS WITHOUT A CONTACT MAKER

Harris J. Ryan

Vol. xvi—1899, pp. 345-357

Description of the theory, construction and method of operating an impulse transformer for measuring wave form. Complete design data.

Discussion, pp. 357-360, by Messrs. C. P. Steinmetz, Samuel Sheldon, C. A. Adams, H. J. Ryan and C. P. Matthews.

Contact makers for measurement of wave form.

C. NON-ELECTRICAL MEASUREMENTS

AN AUTOMATIC PRINTING SPEED-COUNTER FOR DYNAMO SHAFTING

Geo. S. Moler

Vol. x—1893, pp. 331-335

Description of construction and mode of operation.