

17. LIGHTING AND LAMPS

A. LIGHT MEASUREMENT AND UNITS

THE PERSONAL ERROR IN PHOTOMETRY

Edward L. Nichols Vol. vi—1889, pp. 335-341

Experimental investigation of personal error in measurements with Bunsen voltmeter.

No discussion.

NOTE ON A NEW PHOTOMETER

Edward L. Nichols Vol. vii—1890, pp. 257-262

Description of horizontal slip spectro-photometer with results of tests showing probable error in photometry of colored light.

Discussion, pp. 263-264, by Messrs. F. A. C. Perrine, Edward L. Nichols and Elihu Thomson.

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

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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.

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.

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

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PLEA FOR A WORKING STANDARD OF LIGHT

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Suitability of incandescent carbon filament as secondary standard. Recommendations for primary and secondary standards of light.

B. LIGHTING

COST OF MINE LIGHTING

F. P. Mills

Vol. ii—1885, pp. 1-5, paper No. 3

Description of arc lighting installation, with detailed cost of operation and maintenance of the electrical plant.

Discussion, pp. 5-6, by Messrs. E. P. Roberts, T. C. Martin, Sydney F. Shelbourne and E. P. Thompson.

THE ELECTRIC LIGHTING OF PASSENGER TRAINS

Geo. W. Blodgett

Vol. iv.—1887, pp. 206-214

General discussion of the various methods of train lighting, with description of typical installations, giving cost and operation data.

Discussion, pp. 214-232, by Messrs. Ralph W. Pope, T. C. Martin, Geo. W. Blodgett, ——— Phelps, E. E. Ries, ——— Bracken, Thos. D. Lockwood, C. O. Mailloux, Joseph Wetzler and J. M. Pendleton.

General remarks on electric train lighting with special reference to the use of storage batteries. Actual cost figures.

SOME METHODS OF REGULATING ACCUMULATORS IN ELECTRIC LIGHTING

George B. Prescott, Jr.

Vol. vi—1889, pp. 439-475

Discussion of the use of storage batteries in connection with lighting plants to help out the constant load factor and to save distribution copper. Description of typical installation, showing the use of overload circuit breakers and counter e. m. f. cells with the automatic end cell switches. Circuit diagrams.

Discussion, pp. 476-485, by Messrs. George B. Prescott, Jr., Townsend Wolcott, T. C. Martin, John W. Howell, R. W. Pope, Joseph Wetzler and Elihu Thomson.

Description of method of automatically maintaining constant e. m. f. at battery terminals.

ELECTRIC LIGHTING IN THE TROPICS

Wilfred H. Fleming

Vol. vii—1890, pp. 168-174

Outline of electric lighting practice in the East and West Indies, covering the peculiar conditions that influence construction and operation.

No discussion.

**THE INDUSTRIAL UTILIZATION OF THE COUNTER-ELECTROMOTIVE FORCE
OF SELF INDUCTION**

Thomas D. Lockwood

Vol. vii—1890, pp. 226-243

Outline of discovery and development of the uses of counter e. m. f. of self-inductance. Citing references to original articles and patents covering applications of counter e. m. f. of inductance in telephone, telegraph and lighting circuits.

No discussion.

INVESTIGATION OF THE STANLEY ALTERNATE CURRENT ARC DYNAMO

W. B. Tobey and G. B. Walbridge

Vol. vii—1890, pp. 367-378

Description of the Stanley arc generator and of performance tests at different loads. Curves of e. m. f., current, power and exciting current taken by point-by-point method for different loads. E. m. f. characteristic of carbon arc.

Discussion, incorporated with that of paper by Thorburn Reid on "A New Method of Analyzing the Magnetic Reactions of Armatures Applied to the Stanley Arc-Light Alternating Current Machine."

**EXPERIMENTS WITH ALTERNATE CURRENTS OF VERY HIGH FREQUENCY AND
THEIR APPLICATION TO METHODS OF ARTIFICIAL ILLUMINATION**

Nikola Tesla

Vol. viii—1891, pp. 267-319

General discourse on the nature of electricity. Notes on the design and construction of very high frequency generators. Account of experiments with very high frequency and high potential currents, demonstrating the character of discharges through air as affected by electrodes, frequency, potential and various other conditions. Proposal to produce electrostatically incandescent illumination that has the same efficiency and the same economical characteristics of the usual incandescent lamp. The different types of discharge, the lamps and generator are fully illustrated.

No discussion.

SOME RESULTS WITH SECONDARY BATTERIES IN TRAIN LIGHTING

Alexander S. Brown

Vol. iv—1889, pp. 205-210

Brief account of experience of the Pennsylvania R. R. with Faure, Brush, Electric Accumulator Co. and Julien Electric Company batteries.

Discussion, pp. 210-216, by Messrs. George B. Prescott, Jr., C. O. Mailoux, Alex. S. Brown, William H. Pierce, Edward L. Nichols and W. B. Vansize.

General remarks on operation of storage batteries.

RAILWAY TRAIN LIGHTING

A. H. Bauer

Vol. ix—1892, pp. 445-457

Brief résumé of early electric train lighting equipments, followed by description of system using special engine-driven generator installed in baggage car.

Discussion, pp. 457-459, by Messrs. C. R. Gilman, H. Ward Leonard, E. G. Willyoung, E. A. Sperry, Carl Hering, George D. Shepardson and C. F. Street.

A NEW METHOD FOR THE CONTROL OF ELECTRIC ENERGY

D. McFarlan Moore

Vol. x—1893, pp. 437-451

Study of action of varying-in-pressure contact to control the current in a circuit so as to permit the operation of a low-voltage lamp on a high-voltage direct-current circuit. Use of same principle for direct production of light in a vacuum surrounding the variable pressure contact. The fore-runner of the Moore tube lamp.

Discussion, pp. 452-463, by Messrs. Laurence J. Zimmerman, Charles Cuttriss, D. McFarlan Moore, Edward P. Thompson, T. D. Lockwood, W. J. Hammer, P. B. Delany, Charles P. Steinmetz, Gano S. Dunn, A. E. Kennelly, E. J. Houston and William E. Geyer.

Criticism of author's theory. General remarks on stability of performance of vibrating contacts carrying current.

ON THE EFFECT OF HEAVY GASES IN THE CHAMBER OF AN INCANDESCENT LAMP

William A. Anthony

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Account of an experimental investigation of the performance characteristics of lamps filled with vapor of bromine. Analytical study of the cause of blackening and explanation of the effect of gas in lessening blackening.

Discussion, pp. 150-158, by Messrs. Wm. Lisenard Robb, Elihu Thomson, Edward P. Thompson, John W. Howell, W. J. Hammer, S. E. Doane, Theo. J. W. Olan, E. A. Colby, Dr. L. K. Böhm, Otto A. Moses, William A. Anthony, D. McFarlan Moore, R. A. Fessenden, Charles J. Reed, Wilbur M. Stine, B. J. Arnold, Ludwig Gutmann, Mr. Kammer and Dougald C. Jackson.

General discussion of theories of blackening. Experience and experiments with gases and vapors in incandescent lamps.

ON THE SUBDIVISION AND DISTRIBUTION OF ARTIFICIAL SOURCES OF ILLUMINATION

William A. Anthony

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Illumination from distributed sources compared with that from clusters on the basis of minimum intensity. Incandescent vs. arc lamps for street lighting.

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General remarks on candle-power and light distribution from arc lamps. Description of Weber photometer.

SERIES ARC LIGHTING FROM CONSTANT CURRENT TRANSFORMERS

William Lisenard Robb

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Description of constant current transformer installation in Hartford, Conn. Results of performance tests.

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General remarks on alternating versus direct enclosed arc lamps. Comparative costs and cost of operation of various methods of arc lighting.

C. LAMPS

NOTES ON THE PHENOMENA IN INCANDESCENT LAMPS

Edwin J. Houston Vol. i—1884, pp. 1-5, paper No. 2

Description of electrical conduction through vacuum in an incandescent lamp between the incandescent carbon filament and a platinum electrode.

Discussion, pp. 5-8, by Messrs. N. S. Keith, Edwin J. Houston, William H. Preece and James Kelly.

Remarks on flow of electricity.

CHEMISTRY OF THE CARBON FILAMENT

Edw. P. Thompson Vol. i—1884, pp. 1-11, paper No. 10

Brief description of the chemistry of carbon filament manufacture and short description of the Swan, Stanley, Thompson and Weston processes of carbon filament manufacture.

Discussion, pp. 11-13, by Messrs. W. D. Sargent, Wm. H. Preece, N. S. Keith, John Kelly ——— and Chas. Stagl.

THE ELECTRICAL ARC LAMP FRICTIONAL CLUTCH

Edwin P. Thompson Vol. ii—1885, pp. 1-6, paper No. 4

General remarks on friction clutches and brief descriptions of ring clutch and Wetmore coil spring clutch.

Discussion, pp. 6-12, by Messrs. E. P. Thompson, S. F. Shelbourne, J. F. Kelly, E. P. Roberts, W. A. Anthony, ——— Wetmore, Frankland Jannus, Geo. A. Hamilton, H. B. Slater and F. L. Pope.

Action of friction as a function of speed with various materials.

ON THE CHANGE FROM NEGATIVE TO POSITIVE OF THE TEMPERATURE COEFFICIENT OF SOME CARBON FILAMENTS

W. A. Anthony Vol. iv—1887, pp. 198-199

Brief reference to some experiments which indicate a change of sign of the coefficient of resistivity of carbon filaments.

Discussion, pp. 199-200, by Mr. Elihu Thomson,

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THE MAXIMUM EFFICIENCY OF INCANDESCENT LAMPS

John W. Howell Vol. v.—1888, pp. 237-250

Establishment of relations between specific consumption and life, and investigation of the total cost of operation of lamps at different specific consumptions, with a given cost of energy and price of lamps. Directions for choosing the specific consumption under given conditions, so as to get minimum total cost.

Discussion, pp. 250-262, by Messrs. S. S. Wheeler, Jno. W. Howell, Townsend Wolcott, Jos. Wetzler, Charles Wirt, F. B. Crocker, E. T. Birdsall, C. O. Mailloux, F. R. Upton, Franklin L. Pope and C. J. Field.

General remarks on the economic life of incandescent lamps. Experience with 2.5 watts per candle carbon lamps.

THE EFFICIENCY OF METHODS OF ARTIFICIAL ILLUMINATION

Edward L. Nichols

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Experimental and analytical study of the energy efficiency of incandescent and arc lamps. Description of methods of measuring the total energy of radiation and the luminous energy of radiation, as well as the distribution of luminosity in the spectrum with the spectro-photometer. Tables of energy efficiency of various illuminants. Luminosity of different colored lights and distribution of luminosity in spectrum from incandescent lamps operated at various degrees of incandescence.

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General remarks on measurement of illumination value of illuminants.

THE RELATION BETWEEN THE INITIAL AND AVERAGE EFFICIENCY OF INCANDESCENT ELECTRIC LAMPS

William H. Peirce

Vol. vi—1889, pp. 293-306

Description of incandescent lamp test made for Chicago, Burlington & Quincy R. R. Co., covering calibration of instruments and making of tests. Results plotted as curves, showing relation of specific consumption and candle-power to active life, and also relation of average specific consumption to initial specific consumption.

Discussion, p. 307, by Messrs. E. L. Nichols and William H. Peirce.

THE EFFICIENCY OF THE ARC LAMP

Hastune Nakano

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General remarks on efficiency of arc lamps.

FORM AND EFFICIENCY OF INCANDESCENT FILAMENTS

Charles J. Reed

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Development of formulas for expressing the specific consumption in terms of the dimensions of the filament and the constants of the circuit. Relation of specific consumption to the dimensions and form of the filament as determined by these equations. Method of checking the formulas explained with examples.

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Method of measuring temperature differences with Rumford shadow photometer.

LIFE AND EFFICIENCY OF ARC LIGHT CARBONS

Louis B. Marks

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Additional data on the characteristic performance of electric lamp carbon electrode.

A PHOTOGRAPHIC STUDY OF THE ELECTRIC ARC

Edward L. Nichols

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Account of experiments that show the intermittent character of alternating current arc and explaining the cause of surging. Measuring wave form and photographs of arc observed with revolving mirror under various conditions.

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A LIFE AND EFFICIENCY TEST OF INCANDESCENT LAMPS

B. F. Thomas, P. Martin and R. H. Hassler

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THE MOST ECONOMICAL AGE OF INCANDESCENT LAMPS

Carl Hering

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RECENT DEVELOPMENTS IN VACUUM TUBE LIGHTING

D. McFarlan Moore

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Criticisms of the author's methods and system. Results of tests on Moore lighting system.

CONDUCTIVITY OF INCANDESCENT CARBON FILAMENTS, AND OF THE SPACE SURROUNDING THEM

John W. Howell

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THE ENCLOSED ARC LAMP

Wm. H. Freedman, H. S. Burroughs and J. Rapaport

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