

NEW BOOKS, ETC.

LIGHT WAVES AND THEIR USES. By A. A. Michelson, Professor of Physics at the University of Chicago. Chicago: The University of Chicago Press, 1907. Pp. 166; octavo. Price, \$1.63.

Prof. Michelson, whose brilliant work in optics earned for him one of the Nobel prizes, has gathered in this volume eight lectures on light, delivered in 1899 at the Lowell Institute. Although thoroughly scientific in the discussion of the subjects of "Wave Motion and Interference," "Comparison of the Efficiency of the Microscope Telescope and Interferometer," "Application of Interference Methods to Measurements of Distances and Angles," "Application of Interference Methods to Spectroscopy," "Light Waves as Standards of Length," "Analysis of the Action of Magnetism on Light Waves," "Application of Interference Methods to Astronomy," the lectures are primarily directed to those who wish to have the phenomena of light explained to them clearly and accurately and yet without the aid of too much mathematics. In attaining that object, Prof. Michelson has succeeded admirably. The subject of the "Velocity of Light" might well have been expanded into an entire lecture; for the author is more competent to discuss it than any other American physicist, inasmuch as he recently made a new determination of light velocity by an improved method of his own.

MAGIC SQUARES AND CUBES. By W. S. Andrews. With Chapters by Paul Carus, L. S. Frierson, C. A. Browne, Jr., and an Introduction by Paul Carus. Chicago: The Open Court Publishing Company. London Agents: Kegan Paul, Trench, Trübner & Co., Ltd. 1908. 8vo.; cloth; 199 pages. Price, \$1 net.

The curious and manifold characteristics of magic and cube squares receive a very thorough discussion in this work. What may be called the symmetry of mathematics is illustrated by the most peculiar and intricate combinations, which leave out of view but few examples of interest in the past field of magic numbers and include some original methods of construction contributed by the author himself. The building of a square in which all the numbers add the same amount in each horizontal, vertical or corner diagonal column, and which problem may be expanded into cubes, is plotted in scores of arrangements running from 9 to 729 cells or places, and wherein each case permits of beautiful and extensive variations, exhaustively explained in a way that should make the subject popular. About one-half of the volume contains chapters on the Benjamin Franklin squares and reflections on magic squares, by Paul Carus; the mathematical study of magic squares by L. S. Frierson; and magic squares and Pythagorean numbers by C. A. Browne, Jr.

PRACTICAL INDUCTION COIL CONSTRUCTION. By John Pike Loud. Percival Marshall & Co. 18mo.; pp. 128. Price, 50 cents.

This is No. 8 in the series of Marshall's "Practical Manuals," and is a handbook of constructive details and workshop methods used in building and repairing modern spark coils. The subject matter of this book appeared first in the pages of The Model Engineer and Electrician.

A VEST-POCKET HANDBOOK OF MATHEMATICS FOR ENGINEERS. By L. A. Waterbury, C.E. New York: John Wiley & Sons. London: Chapman & Hall, 1908. Vest-pocket size; morocco; vi+91 pages; 61 figures. Price, \$1 net.

This pocket edition comprises sections on algebra, trigonometry, analytical geometry, calculus, theoretical mechanics and mechanics of materials, and most of the matter was procured from leading sources. Those who have studied or are studying the branches of mechanics generally taught in engineering courses, will find it a reliable and convenient reference book.

INDEX OF INVENTIONS

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Deister, 895,734; Ore separating and concentrating machine, W. P. Clifford, 895,725; Ores, treating, R. Baggaley, 895,939; Organ, electric, W. R. Whitehorse, 895,925; Packing, metallic, G. D. Rollins, 895,791; Pan. See Evaporating pan. Paper feeding mechanism, O. W. Johnson, 895,465; Paper roll holder, W. J. Meyer, 895,572; Pen, fountain, W. A. Houston, 895,453; Pen or pencil point protector, H. M. Sturgis, 895,511; Phonograph, H. Schroder, 895,900; Phonograph and talking machine sound amplifier, J. H. J. Haines, 895,853; Phonograph disk record holder, W. D. Mitchell, 895,655; Phonographic machine attachment, F. Harding, 895,456; Photographic enlarging or reducing apparatus, H. R. Cook, 895,968; Photographic paper, treating, E. A. Cunningham, 895,970; Piano action supporting means, E. Sandner, 896,066; Piano player, combined, F. H. Schwesinger, 896,056; Pie machine, O. Colborne, 895,949; Pipe, I. O. Russell, 895,498; Pipe collar, A. T. Booth, 895,949; Pipe coupling, K. W. Carlgren, 895,617; Pipe coupling, train, W. G. Felkner, 895,735; Pipe in trenches, machine for laying, T. De Young, Jr., 895,439; Pipe, rod, and wire cable clamp or coupling, Bouchard & Bravin, 896,053; Pistol holster, C. E. Gaskill, 896,004; Piston, E. Cohen, 895,963; Plane, adjustable, O. J. Sund, 895,796; Planter marking attachment, corn, O. Smith, 895,507; Platen, H. H. McIntire, 895,577; Plow disk support, L. Case, 895,961; Plug, attaching, H. Geisenhoner, 896,006; Pneumatic action, H. Schwesinger, 895,804; Polishing wheel, J. W. Hyatt, 895,641; Pool table triangles, device for releasing, O. W. Kurth, 895,474; Portable furnace, G. E. Ruhmann, 895,688; Power transmitting device, L. K. Clark, 895,618; Pressure measuring apparatus, hydraulic, A. H. Emery, 895,991; Pressure retaining mechanism, equalizing triple, B. Canell, 895,957; Printer's filler block, W. S. Warnock, 895,607; Printing machine, card, M. H. Mann, 896,062; Printing press, L. E. Morrison, 895,629; Printing press bed movement, S. Whitlock, 895,820; Projectile, G. H. Hoxie, 896,021; Pulley, driving, O. Hartmann, 895,559; Pulverizer, J. Vandegrift, 895,917; Pulverizer, rolling, J. W. Dearing, 895,911; Pump, air, K. Johnston, 895,943; Pump, centrifugal, S. Udstad, 895,604; Pump, force feed lubricating, J. Rice, 895,683; Pump, hydraulic pressure, J. W. Neilson, 895,666; Pump, rotary, E. K. Morehouse, 895,488; Punching machine, J. L. Bernard, 895,944; Puzzle rolling pin, J. G. Allen, 895,710; Radiator, T. J. Kehoe, 895,767; Radiator valve, B. E. Van Auken, 895,517; Radium preparation, H. Lieber, 895,478; Rail bond, M. M. Wood, 895,928; Rail brace and fastening means therefor, G. W. Whiteman, 896,049; Rail fastening, P. Reeser, 895,939; Rail joint, H. J. Thomas, Jr., 895,909; Rail joint, T. J. Welch, 895,921; Rail joint, W. Oppelt, 896,040; Rail joint, chair, and tie, J. Frampton, 896,001; Rail joint, insulated, B. G. Braine, 895,839; Railway brake, C. F. Gerlinger, 895,851; Railway catcher and delivery system, M. C. Keefer, 896,024; Railway chair, S. Wheelhouse, 895,519; Railway cross tie, W. Boyer, 895,949; Railway crossing, A. Tibbs, 895,600; Railway crossing, E. T. Dumas, 895,985; Railway, electric, J. A. Garey, 896,071; Railway equipment, A. Pacios, 895,784; Railway frog, Strong & Haring, 895,698; Railway, pleasure, F. A. Church, 895,427; Railway rail bond, electric, W. E. Oakley, 895,582; Railway signal, H. A. Dillon, 895,983; Railway signal, electric, J. S. Sims, 895,589; Railway switch, M. W. Griffin, 896,011; Railway tie, W. Bates, 895,831; Railway tie, Trainor & Smith, 895,687; Railway tie, Rozine & Guthrie, 895,687; Railway tie and rail fastening, metallic, J. A. Stoops, 895,908; Railway tie, metallic, F. Schell, 895,799; Railway tie tamping machine, K. Chruszczyk, 895,964; Ranges, etc., magazine feeder for, H. Cull, 895,540; Rat trap, S. S. Boyd, 895,416; Rat trap, T. Knight, 895,473; Ratchet wrench, G. Hollandsworth, 895,757; Razor guard, safety, A. Warner, 895,200; Razor, safety, E. Claus, 895,429; Razor, safety, J. H. Flagg, 895,997;