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Loom, filling replenishing, E. S. Stimpson 710,023
Loom let-off arresting mechanism, E. S. Stimpson 710,024
Loom loose reed motion, E. Herzig..... 710,192
Loom weft replenishing mechanism, Talbot & Rossetter 710,379
Looms by the quantity of weft in the shuttles, mechanism for controlling, J. H. Klerx 709,910, 709,911
Lubricating pump operating apparatus, B. Ivor 709,986
Lubricator and liquid dispenser, C. F. Clements 710,184
Machinist's V-block, Cobb & Spaulding... 709,873
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Mattress, hospital, D. T. Rosett 710,076
Measuring and emptying device for bottles, B. Arthurs 709,858
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Merry-go-round, land, marine or submarine, A. Davidson 710,043
Metal plate lifting device, E. B. Clark, 2nd 710,041
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Milker, cow, F. A. West 710,384
Mirror hanging, J. G. Allen..... 710,235
Molding flask, J. Mills 710,331
Mooring block or clump, G. C. L. Lenox. 709,914
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Movement controlling mechanism, variable, H. D. Meier 710,202
Mower, A. Mayer 710,289
Mower, lawn, F. L. Adams..... 710,131
Mowing machine, White & Jones..... 710,228
Musical instrument transposing device, M. Clark 709,963
Negative plates for bichromated gelatin processes, producing, A. Leuchter..... 710,106
Nipple, E. E. Menges 710,114
Nitrogen compounds from atmospheric nitrogen, manufacturing, Bradley & Lovejoy 709,867
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Numbering machine, F. M. Turck 710,380
Nut, vehicle axle lock, Belfield, Shearer, Findlay & G. Belfield..... 710,240
Nut wrench, adjustable, J. T. Viles..... 710,382
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Package carrier, E. J. Stewart..... 709,936
Packing, rod, A. B. Pratt..... 710,337
Pail filling and indicating device, J. H. Wilson 710,230
Pail hook, C. W. Mitchell 709,919
Paper, etc., machinery for cutting and folding, R. C. Seymour 710,080
Paper roll holder, W. H. Belknap..... 710,034
Paper tube making machine, J. H. and E. L. White 710,386
Parer, apple, M. B. Brooks..... 710,351
Parer feeding apparatus, fruit, L. I. Yeomans 710,390
Pen or pencil holder, J. S. McClung..... 710,293
Pencil and sharpener therefor, R. Y. Cormack 710,255
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Photographic emulsion, Y. Schwartz..... 710,019
Photography, apparatus for animated, H. M. Reichenbach 710,339
Piano player valve, J. H. Chase..... 710,097
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Placket fastener, T. M. Stearn..... 710,123
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Planter, cotton, W. Furlong..... 709,895
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Plow, E. Hankins 709,901
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Pneumatic tool, J. Keller..... 710,196
Pole, jointed, M. Nelson..... 709,924
Policeman's club holder, F. H. Audley.... 710,236
Power shovel, it. Thew..... 710,223
Printing color for lithographic or metallographic printing, Adelsberger & Friedmann 710,233
Printing machine, roller, T. J. Smith..... 709,933
Printing machine, stencil, A. B. Dick..... 709,885
Propeller, C. A. Manker 710,111
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Punching bag supporting device, G. S. Maxwell 710,112
Puzzle, W. H. Emery 709,888
Pyrotechnic compound, A. Eichengrun..... 710,047
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Rail joint, Minck & Droste..... 710,290
Rail support, W. E. Jaques ....710,152 to 710,154
Railway danger signal, W. Washa..... 710,383
Railway sand distributer, W. H. Bell..... 710,134
Railway signaling, electrical system of recording and checking as applied to, W. H. M. Weaver 710,348
Railway switch operating device, J. C. Booth 709,865
Railway system, electric, W. B. Potter... 710,072
Railway tie, metallic, H. W. Avery..... 710,172
Railway track structure, E. B. Entwistle.. 709,975
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Ratchet wrench, J. E. Dickie..... 710,185
Refrigerator, H. Aylmer 710,173
Regenerator burner, C. W. Weiss..... 710,130
Resistance coil and support therefor, H. P. Davis 710,143
Revolver ejector mechanism, J. D. Robertson 710,008
Riveter, Pneumatic, J. Keller..... 710,197
Road roller, L. B. McAlpine..... 710,165
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Rotary engine, T. J. Bush..... 709,961
Rotary engine W. F. Evans..... 710,261
Rowing appliance, W. B. Goodwin..... 710,147
Rubber dam holder, G. W. Todd..... 710,306
Saddle, J. R. and C. B. Hastings..... 709,904
Saddle pad, pneumatic, H. R. Rensman.... 709,930
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Seeding machine, Heath & Baseman..... 710,272
Sewer trap, J. Pratt 710 209
Sewing machine, J. T. Hogan..... 710,150
Sewing machine bobbin holder case, A. Doring 709,886
Sewing machine, buttonhole, J. T. Hogan.. 710,149
Sewing machine table or cabinet head, Cuber & Hackenbroch 710,042
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Shade roller bracket, Clowse & Stevens... 709,964
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Sheet metal pipe, F. L. Filson..... 710,262
Shingling carriage and gage, F. C. Leek.. 710,281
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Show window construction, H. Hunter... 709,985
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Skein holder, L. M. Tressel 710,126
Skirt holder, C. W. Baughman..... 709,862
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Speed mechanism, Heath & Baseman..... 710,271
Spool stand, E. Buffum..... 710,095
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Spring cushion, A. C. McCord....709,998, 709,999
Spring structure support, W. G. Engle.... 710,260
Sprinkler head, P. Huebner..... 709,907
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Stamps, operating device for dating or other, H. De Wallace 710,144
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Stering gear, electrical, M. W. Day..... 710,045
Still, ammonia, G. Stroh..... 710,221
Stitch ripper, F. L. Marshall..... 709,917
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Stove, H. Hoefli..... 710,193
Stove, gas, M. Griswold, Jr..... 710,053
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Stove, summer cook, C. E. Cooke..... 709,876
Stovepipe thimble, A. Staub..... 710,168
Submarine transportation system, A. Davidson 710,044
Suspender end loop, H. E. Barnett..... 710,092
Suspension hook, Kerr & Lauster..... 710,061
Switch: See Electric switch.
Tapping and stud-setting device, Osteman & Blood 710,116
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Telegraph system, wireless, H. Shoemaker. 710,121, 710,122
Telegraph system, wireless, C. D. Ehret.. 710,354, 710,335
Telephone exchange toll apparatus, W. W. Dean 710,318
Telephone lines, selective calling appliance for, F. R. McBerty..... 710,333
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Thill coupling, A. Mendenhall..... 710,365
Thresher, pea, Paris, Steelman & Haverfield 710,366
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Tire, vehicle, F. P. Brining..... 709,959
Tire, wheel, E. Horton..... 710,274
Tobacco leaf stringing machine, S. D. Wheeler 710,027
Tobacco ordering chamber, J. M. Taliaferro 709,938
Toe, box, H. H. Beckwith..... 710,239
Tool holder, J. F. Bachmann..... 709,953
Tool holder, A. H. and J. A. Bedworth.. 710,174
Torpedo, railway, E. S. Lafferty..... 710,362
Torpedo shell protector, J. M. Hatfield.... 710,323
Toy, D. J. Wilson..... 710,090
Toy air gun, P. D. Horton..... 710,359
Toy, walking, E. A. Jeffreys..... 709,987
Train order holder, L. C. Gibbs..... 710,265
Trap, J. A. Clukies 709,871
Truck, stove, J. H. Smith..... 710,394
Tube machine, F. Deming..... 710,046
Turbine gate balancing device, W. W. Tyler 710,381
Type distributing apparatus, A. A. Low. 710,066
Type line detaching mechanism, Johnson & Low 710,057
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Typewriter, electrical, C. Gibbs..... 710,264
Typewriting machine, M. S. Eylar..... 709,893
Typewriting machine, C. F. Hopkins..... 709,906
Typewriting machine, G. H. Williams.... 710,089
Umbrella rib and stretcher joint, C. MacMillan 710,328
Universal coupling, A. G. Mather..... 709,992
Unloading apparatus, F. H. Treat..... 710,224
Vaccine container, H. M. Alexander..... 710,234
Valise, telescoping, C. A. Bodwell, Jr.... 710,037
Valve, E. G. Watrous..... 710,129
Valve gear, P. H. White 709,949
Valve lever spool, P. Thomas..... 709,940
Valve, street sprinkler, M. G. Bunnell... 709,960
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Vehicle, motor, F. C. Goddard..... 709,897
Vehicle, road, P. Christiansson..... 710,249
Veneer bending machine, E. Aber..... 710,231
Veneers, apparatus for edge uniting, W. M. Boenning 709,864
Ventilator, J. R. Wild..... 710,350
Vise, pipe, Vogelbach & Gray..... 709,944
Wagon brake, Swisher & Burger..... 710,345
Wagon, dumping, E. M. Sandy..... 710,214
Wardrobe, L. Robertson 710,009
Washstands, means for attaching bowls to the slabs of, J. A. Chukies..... 709,872
Water closet, D. S. Schureman..... 710,342
Water closet seat, detachable, H. M. Solveson 710,021
Water closet valve, E. G. Watrous..... 710,128
Water cooling apparatus, W. J. Dossey.... 709,887
Water tube boiler, E. G. Rust 710,340
Water wheel, R. E. Woolman..... 710,029
Wheel: See Water wheel.
Wheel, M. S. Shotwell..... 710,375
Wind turbine, J. Kaiser 710,277
Window seat, L. Wagener..... 710,127
Window, sliding, W. E. Hardeman..... 710,322
Wire reel truck, F. W. Schooley..... 709,932
Wire straightener, J. G. Iverson..... 710,151
Wrapper, package, L. S. Miller..... 710,332
Wrench, T. H. Cahill..... 710,040
Wrench, M. M. Murray 710,164
Wrench, J. T. Burr..... 710,179
X-rays, means for preventing injury in using, L. T. Lowder..... 710,201

DESIGNS.

Bicycle rack, M. G. Merritt..... 36,091
Clock case, L. V. Aronson..... 36,084
Coin-controlled mechanism, case for, M. Benedict 36,087
Finger ring, M. L. Powers..... 36,083
Jardiniere stand, F. W. Olsen..... 36,086
Lamp body, A. L. Baron..... 36,085
Shade cloth, J. H. Wright..... 36,093
Stove, C. Puddefoot 36,090
Tile, A. Plant 36,089
Umbrella cover, E. L. Smith 36,092

TRADE MARKS.

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Beer and malt extract, Birk Bros. Brewing Co. 38,968
Beverages, certain named carbonated, Static Carbonating Company 38,969
Billiard cloth, B. A. Stevens..... 38,943
Cap visors, E. Mattes & Son..... 38,945
Carbonating apparatus and appliances, Static Carbonating Company 38,970
Coffees, Southern Coffee Company..... 38,966
Cotton threads, New England Cotton Yarn Company 33,944
Covering and protective materials, certain named, Standard Paint Company..... 38,947
Cycles, motor vehicles and their parts, Fabrique de Moteurs & de Machines (ancienne maison Zurcher, Luthi & Cie.).. 38,973
Dyestuffs, coal tar, Actien-Gesellschaft fur Anilin-Fabrikation 38,951
Films, plates and photographic papers, Actien-Gesellschaft fur Anilin-Fabrikation 38,950
Fire extinguishers, chemical, Tea Tray Company of Newark, N. J..... 38,972
Flour, N. Story & Co.....38,960, 38,961
Flour, wheat, H. H. King & Co..... 38,962
Food choppers, cylindrical, Landers, Frary & Clark 38,971
Fruits, dried, Aspegren & Co..... 38,959
Hair remedy, A. P. Simar..... 38,954
Medicinal substances, certain named, J. W. Gedney 38,958
Milk and milk products, Bernese Alps Milk Co. 38,965
Oils, illuminating, Philadelphia Chemical Co. 38,952
Packings, plastic metallic, Hileman-James Co. 38,948, 38,949
Polishing, cleaning and preserving certain named surfaces, manufactured powder for, Silver Salt Company..... 38,953
Remedy for la grippe, catarrh, colds and headaches, F. W. Diemer 38,955
Remedy for the blood, A. B. Scutt..... 38,956
Sheetings, Belton Mills 38,942
Sugar, refined, Federal Refining Company.. 38,964
Swimming sleeves, safety, F. B. Wesson... 38,946
Tonic, chill and fever, T. S. Roberts..... 38,957
Vinegar, spirit, C. E. Meyer & Co..... 38,967

LABELS.

"Airlnit," for footwear, F. W. Slater..... 9,451
"Baume de Princesse," for facial massage preparation, Alleshouse Pharmacal Co.... 9,452
"C. Bohley's Cough Medicine," for cough medicine, C. Bohley 9,453
"Capitol Maryland Rye," for whisky, J. A. Bokel 9,460
"Cheekawgo," for cigars, American Litho graphic Company 9,465
"Corn Husker," for Cigars, Schmidt & Co.. 9,471
"Diver Brand Sponges," for sponges, A. Isaacs & Co. 9,450
"Don Carlito," for cigars, Heffheimer Cigar Co. 9,470
"Dr. Bazemore's Syrup Castor Oil," for Castor oil, W. J. Bazemore & Son..... 9,456
"Elfin Brand," for sugar corn, S. S. Pierce Co. 9,473
"Golden Pheasant," for tea, Milliken, Tomlinson Co. 9,472
"India Planta," for cigars, American Lithographic Company 9,467
"Jean Bart," for cigars, American Lithographic Company 9,468
"Magnolia," for chewing gum, Lidwell Gum Co. 9,464
"Marvelous Waterproof Shoe Polish," for waterproof oil polish, J. F. Smith..... 9,457
"Miss Butte," for cigars, American Lithographic Company 9,466
"Mother's Own Ointment," for ointment, Mother's Own Company 9,454
"9-16 Labor Saving," for soldering fluid, A. Levytansky 9,458
"P-A-Y-M-E Concentrated Extract of Vanilla," for extract of vanilla, L. E. Roy..... 9,462
"Select Combination," for cigars, American Lithographic Company 9,469
"Spring Bank Lithia Cherry Phosphate," for cherry phosphate, Whallen Bros..... 9,459
"St. Anthony's Oil," for medicinal oil, Pasadena Medical Company 9,455
"The Pepper Co, Pure Confectionery, Peabody, Mass.," for confectionery, Pepper Company 9,463
"Upper Ten Cocktails," for cocktails, W. R. Lundy & Co. 9,461

PRINTS.

"Clark's Instant Foot Comfort," for foot remedy, Globe Chemical Works..... 558
"Wright's Health Underwear," for underwear, Seiter & Kappes 557

A printed copy of the specification and drawing of any patent in the foregoing list, or any patent in print issued since 1863, will be furnished from this office for 10 cents, provided the name and number of the patent desired and the date be given. Address Munn & Co., 361 Broadway, New York.

Canadian patents may now be obtained by the inventors for any of the inventions named in the foregoing list. For terms and further particulars address Munn & Co., 361 Broadway, New York.

NEW BOOKS, ETC.

A PRACTICAL TREATISE ON MODERN GAS AND OIL ENGINES By Frederick Grover, A.M.I.C.E., M.I.E.E. London: John Heywood, Manchester: The Technical Publishing Company, Ltd. 1902. 16mo. Pp. 372. Price $2.

This third edition of Grover's practical treatise is an enlarged textbook on gas and oil engines. As the author informs us in his preface, the enlargements consist of chapters on gas engine efficiency and the application of special diagrams. Experiments on the explosion pressures of acetylene and air are included.

THE PRACTICAL CATECHISM. Compiled from the Regular Issues of Power. New York: Hill Publishing Company. 1902. Pp. 210. 8vo. Price $2.

One of the most interesting features of our esteemed contemporary Power consists of the electrical information which has been conveyed from time to time in serial form. The author has collected this information, added much that is new, much that has not been published in the pages of the periodical mentioned, and has succeeded in producing a book remarkable for its practical simplicity. For the presswork, and for the admirably clear illustrations, the publishers deserve praise.

PIPES AND TUBES. Their Construction and Jointing. Together with All Necessary Rules, Formulæ and Tables. By Philip R. Björling. London and New York: Whittaker & Co. 1902. 16mo. Pp. 244. Price $1.25.

The author has prepared a practical handbook on the making and use of pipes and tubes of all kinds. Not the least valuable portion of his work is an appendix comprising tables compiled from well-recognized authorities.

PHYSICS. A Textbook for Secondary Schools. By Frederick Slate. New York: The Macmillan Company. London: Macmillan & Co., Ltd. 1902. 16mo. Pp. xxi., 414.

The author tells us in his preface that this elementary course in physics is designed for young people from sixteen to eighteen years of age, who are nearing the close of their training in a secondary school. He has endeavored to present the subject from a standpoint entirely different from that to which we are accustomed. His book is not dogmatic, neither is it a laboratory manual pure and simple. It may be best described as a logical presentation of the subject of physics, in which the student gradually passes from the elementary phases of the subject to those of more complex character.

COLONIAL GOVERNMENT. An Introduction to the Study of Colonial Institutions. By Paul S. Reinsch. New York: The Macmillan Company. London: Macmillan & Co., Ltd. 1902. 16mo. Pp. x., 386. Price $1.25.

Prof. Reinsch has presented an interesting study of the elements of colonial government. He discusses the modes and methods of colonial expansion from a historical point of view; the general forms of colonial government; and administrative organization and legislative methods. All this information does not apply directly to American problems; for it is the purpose of the book merely to set forth in brief and simple form the colonial policy of the great European powers.

IN A TUSCAN GARDEN. By John Lane. London: The Bodley Head. 1902. 16mo. Pp. 419. Price $1.50.

GARDEN-CRAFT, OLD AND NEW. By John D. Sedding. London: John Lane. The Bodley Head. 1902. 12mo. Pp. 215.

Mr. John Lane more than any other publisher has seen to it that the literature of horticulture shall not decline. Hardly a year passes but a book on gardens issues from his press. The two volumes which lie before us are carefully written little books, which tell what they have to tell in a way that is both interesting and instructive. "In a Tuscan Garden" is not what might be called a practical book; its author is too much of a litterateur for that. And yet it tells much that is of great value to the gardener of England and of America.

The late Mr. John Sedding's "Garden-Craft, Old and New" ought to be more or less known among lovers of gardens. Mr. Sedding knew his gardens, and particularly his old-fashioned English gardens, as few do. Rev. E. F. Russell with a loving care has prepared the manuscript for the press and has succeeded in producing a work which does its author credit and which may well be regarded as a most desirable addition to garden literature.

A PHILOSOPHICAL ESSAY ON PROBABILITIES. By Pierre Simon Laplace. New York: John Wiley & Sons. London: Chapman & Hall, Ltd. 1902. 16mo. Pp. iv, 196. Price $2.

Laplace's Probabilities is too well known to mathematicians to need any extended review in these columns. It is necessary merely to say that the translators have performed their work with faithfulness.

L'ELECTRICITÉ. Déduite de l'Expérience et Ramenée au Principe des Travaux Virtuels. M. E. Carvallo. Paris: C. Naud. 1902. Price 50 cents.

In his charmingly-written preface Dr. Carvallo tells us that it is his purpose to study fixed or variable electrical states. His method of exposition is to interpret mechanically experimental laws. His principal conclusion is the deduction of two fundamental laws which are the generalization of two laws of Kirchhoff. The author divides his work into two parts. In the first, he explains our present theories of the phenomena of induction; and the second is devoted to electrical manifestations. In both parts the method of exposition is the same. First comes the observation, then an enunciation of experimental laws, and finally an interpretation of these laws in mechanical parlance.

THE HYDRO-METALLURGY OF COPPER. By M. Eissler, M.E. New York: D. Van Nostrand Company. London: Crosby Lockwood and Son. 1902. Pp. xii, 228. Price $4.50 net.

Mr. Eissler has gathered in this volume probably all the more important descriptions of the various processes for the hydrometallurgical treatment of copper ores.

THE FOUNDATIONS OF GEOMETRY. By David Hilbert, Ph.D. Chicago: The Open Court Publishing Company. London: Kegan Paul, Trench, Trübner & Co., Ltd. 1902. Pp. vii, 132. 16mo. Price $1.

This book comprises a series of lectures given by Professor Hilbert on Euclidean geometry at the University of Göttingen during the winter semester 1898-1899. Professor Hilbert commences his discussion by considering three systems of things which he calls points, straight lines and planes. He constructs a system of axioms connecting these elements. The purpose of his investigation is to discuss systematically the relation of these axioms to one another and the bearing each has on the logical development of Euclidean geometry.

ARCHITECTURAL REFINEMENTS IN ITALIAN CHURCHES. By William H. Goodyear, Curator of Fine Arts, Museum of the Brooklyn Institute. Pp. 166-196.

When Mr. Goodyear writes on any architectural subject he is always sure to be read with interest. His contributions to various

architectural papers have been of rare value. In his present paper on Italian Churches he shows a nice artistic appreciation of the work of the early Italian architects and furnishes us with a mass of information that is distinctly new.

Department of the Interior. U. S. Geological Survey. Charles D. Walcott, Director. Reconnaissance in the Cape Nome and Norton Bay Regions, Alaska, in 1900. By Alfred H. Brooks, George B. Richardson, Arthur J. Collier and Walter C. Mendenhall. Washington: Government Printing Office. 1901. Royal 8vo. Pp. 222.

Twenty-First Annual Report of the United States Geological Survey to the Secretary of the Interior, 1899-1900. Charles D. Walcott, Director. In seven parts. Part VII. Texas. Washington: Government Printing Office. 1901. Royal 8vo. Pp. 666. 71 plates. 80 figures.

Commercial Relations of the United States With Foreign Countries During the Year 1901. In two volumes. Vol. I. Issued from the Bureau of Foreign Commerce, Department of State. Washington: Government Printing Office. 1902. Pp. 1191.

Annual Reports of the War Department for the Fiscal Year Ending June, 30, 1901. Report of the Chief of Engineers. Part III. Washington: Government Printing Office. 1901. 8vo. Pp. 1751 to 2596. Index pp. 53.

Annual Report of the War Department for the Fiscal Year Ending June 3, 1901. Report of the Chief of Engineers. Part IV. Washington: Government Printing Office. 1901. 8vo. Pp. 2597 to 3462. Index pp. 53.

United States Geological Survey. Adephagous Clavicorn Coleoptera from the Tertiary Deposits at Florissant, Colorado, with Descriptions of a Few Other Forms and a Systematic List of Non-Ryhn-choporous Tertiary Coleoptera of North America. By Samuel Hubbard Scudder. Washington: Government Printing Office. 1900. Large square quarto. Pp. 145. With 11 plates.

Eighteenth Annual Report of the Bureau of American Ethnology to the Secretary of the Smithsonian Institution, 1896-1897. By J. W. Powell, Director. In two parts. Part II. Washington: The Government Printing Office. 1899. Large 8vo. Pp. 527-648. Plates cviii to clxxxv.

A B C of the Steam Engine. With a Description of the Automatic Governor. By J. P. Lisk, M.E. Six large folding plates of details. New York: Spon & Chamberlain. London: E. & F. N. Spon, Ltd. 1902. Pp. 30.

A Graphic Method for Solving Certain Questions in Arithmetic or Algebra. By George L. Vose. New York: D. Van Nostrand Company. 1902. 32mo. Pp. 62. Price 50 cents.

Nature in New Zealand. Compiled by James Drummond and edited by Captain F. W. Sutton, F.R.S., Christchurch, Wellington and Dunedin: Whitcombe and Tombs, Limited. 16 mo. Pp. 188.

Poultry Architecture. A Practical Guide for Construction of Poultry Houses, Coops and Yards. 100 illustrations. Compiled by George B. Fiske. New York: Orange Judd Company. 1902. 16mo. Pp. vii, 130.

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Sur les Principes Fondamentaux de la Théories des Nombres et de la Geométrie. Par H. Laurent. Paris: C. Naud, Publisher. Pp. 68. Price 75 cents.

Section A of the Mechanical Index Comprising Machine Tools. Metal Working Machinery and Accessories, Machinists Small Tools, Etc., including a general index to headings, in English, German and Spanish. New York: The Industrial Press. 1902. Pp. 159.

Bulletin of the Bussey Institution, Jamaica Plain, Boston. Vol. III. Part II. Cambridge: Published by the University. 1902. Pp. 45.

Modern Carpentry. A Practical Manual By Fred. T. Hodgson, architect. Illustrated. Chicago: Frederick J. Drake & Co. 1902. 16mo. Pp. 193.

Around the "Pan" With Uncle Hank. His Trip Through the Pan-American Exposition. By Thomas Fleming. Published by The Nut Shell Pub. Co., New York. 1902. Pp. 262. 8vo.

Notes and Queries.

HINTS TO CORRESPONDENTS.

Names and Address must accompany all letters or no attention will be paid thereto. This is for our information and not for publication.
References to former articles or answers should give date of paper and page or number of question.
Inquiries not answered in reasonable time should be repeated; correspondents will bear in mind that some answers require not a little research, and, though we endeavor to reply to all either by letter or in this department, each must take his turn.
Buyers wishing to purchase any article not advertised in our columns will be furnished with addresses of houses manufacturing or carrying the same.
Special Written Information on matters of personal rather than general interest cannot be expected without remuneration.
Scientific American Supplements referred to may be had at the office. Price 10 cents each.
Books referred to promptly supplied on receipt of price.
Minerals sent for examination should be distinctly marked or labeled.

(8703) J. M. L. asks: 1. Will you please give me the two laws of thermodynamics? 1. The first law of thermodynamics is: "Whenever work is performed by the agency of heat, an amount of heat disappears equivalent to the work performed; and whenever mechanical work is spent in generating heat, the heat generated is equivalent to the work thus spent." (De Schanel.) The formula is $W = JH$. W is the work in foot-pounds, if English measures are used; H the degrees which one pound of water would be raised in temperature by the heat; and J, Joule's equivalent, 772 foot-pounds, as determined by Joule, or 773 foot-pounds as redetermined lately by Rowland. The second law is variously stated by different authors. Perhaps the simplest form of the law is: "It is impossible for a self-acting machine, unaided by any external agency, to convert heat from one body to another of a higher temperature." (Clausius.) Another form is: "The efficiency of a completely reversible engine is independent of the nature of the working substance, and depends only on the temperature at which the engine takes in and gives out heat; and the efficiency of such an engine is the limit of possible efficiency for any engine." (De Schanel.) 2. If the specific heat of gold is 0.03244, what weight of it at 470 degs. C. will raise 1 kilogramme of water from 12.3 degs. to 15.7 degs, C.? A. The water is to be raised 3.4 deg. C. 1,000 grammes require 1,000 calories per degree of rise of temperature, and for 3.4 deg. rise require 3,400 calories. The gold is to lose 470 deg. —15.7 deg., or 454.3 deg. One gramme of gold gives out 0.03244 calorie for each degree of loss of temperature, and for 454.3 deg. will give off $0.03244 \times 454.3 = 14.737$ calories. As many grammes of gold will be required as 3,400 contains 14.737, which is 230.7 grammes of gold.

(8704) T. A. says: The following method is given in "Cyclopedia of Receipts" for deodorizing petroleum: Mix chloride of lime with petroleum in the proportion of three ounces to each gallon of the liquid to be purified. It is then introduced into a cask. Some muriatic acid is then added and the mixture is well agitated, so as to bring the whole of the liquid into intimate contact with the chlorine gas. Finally the petroleum is passed into another vessel containing slaked lime, which absorbs the free chlorine and leaves the oil sufficiently deodorized and purified. Can you suggest the quantities required of muriatic acid and slaked lime? Also if the cask should have one end open or agitated with the bung in? Is there any danger attending this process? A. The quantities of muriatic acid and slaked lime to be used in deodorizing petroleum are not important. If an excess of acid were used, it would disappear when the liquid is passed through the lime. Probably 3 fluid ounces per gallon will be sufficient to furnish enough chlorine for the process. Similarly, the bung may be in or out of the cask. There will not be excessive pressure in the operation; yet if the cask is open, the escape of chlorine will not be very annoying in the open air. The only danger we can see in the work is the inhaling of chlorine gas. This would be disagreeable, and if a large quantity were taken into the lungs, it would be dangerous.

(8705) P. E. J. asks: Does liquid when boiling give off air in the shape of bubbles which pass to the surface? If this is the case, why does mercury do so if this metal is always used to extract air from tubes, etc.? Or is it only the vapor of Hg that bubbles? A. When a liquid is boiling it is giving off its own vapor into the air, if it has been heated for a time sufficient to drive off the contained air. Even mercury contains air under ordinary conditions. Only after it has been heated is the air driven out. In filling a barometer tube the mercury is boiled to get rid of its contained air, which would injure the vacuum.

(8706) W. C. P. asks: Some few years ago I saw on sale a self-lighting gas-tip which I believe was referred to as a platinum sponge. Have you any publications which treat on this subject, its principle and method of construction? A. Self-lighting gas jets are made by placing a lump of spongy platinum so that the gas will strike it. The absorbing power of the sponge is very great and the absorbed gas becomes so hot that the sponge is heated to a red heat and ignites the gas. Platinum sponge can be obtained from dealers in chemicals. It is simply the Doebereiner's lamp or philosopher's lamp, as it was called, which was used for lighting lamps, etc., before the invention of the friction match. The sponge for some reason soon loses its efficiency.

(8707) J. H. asks: 1. Can you tell me if it is possible to get mica in solution, if so, how? A. Mica is not soluble. It may be ground to a powder and formed into a paste with shellac or some varnish. 2. Is there any form of silica soluble in water, or any other simple solvent? A. There are soluble silicas. Soluble glass, sodium silicate, or potassium silicate, is of this sort. These substances are often called water glass. 3. I once saw some small clay vessels made on the potter's wheel; after a vessel was finished, the exhibitor poured some transparent liquid upon it from a bottle, which glazed and hardened it at once. Can you give a formula for such a liquid? A. You will find a large number of formulas for glazes in the "Scientific American Cyclopædia of Recipes," price $5 by mail. We do not know to what glaze you refer in your inquiry.

(8708) W. J. B. asks: 1. What gas has the most ascending power to the square inch? How much ascending power has it to the square inch? A. Hydrogen is the lightest gas known, and has therefore the greatest lifting power in a balloon; 1,000 cubic feet will lift seventy pounds. 2. Can this gas stand being slightly compressed? A. Hydrogen can be compressed to any extent. 3. Can you give a receipt for partially or wholly petrifying wood and leather? A. If wood be soaked in copperas or sulphate of copper and dried, and the process be repeated till the wood is thoroughly saturated with the chemical, its structure when burned will remain in the peroxide of iron left. Petrified wood in nature is another thing. This is probably formed by the slow action of silica. As a particle of wood decays a particle of silica takes its place, and finally all the vegetable matter is replaced by mineral matter. This process has not been imitated artificially.

(8709) J. D. C. writes: Please send me a receipt for keeping cider sweet. Please tell me also if it will stay sweet in vinegar barrels. A. To preserve cider without fermentation, it is necessary that it be made from good fruit, rejecting all decayed apples, and keeping all apparatus in a clean and sweet condition during the manufacture of the cider. The barrels or casks into which it is put must also be clean and sweet. Vinegar barrels cannot be used, since they already contain the germs of fermentation. Scientific American Supplement No. 313, price ten cents, contains instructions for making and preserving cider. In addition to the preservatives given in that article, you may use salicylic acid, one half ounce to a cask of fifty gallons. It is important to exclude the air as much as possible from the cask all the time, and to avoid stirring up the preservative from the bottom of the cask where it settles.

(8710) M. O. C. asks: Can you inform us how to copper common iron castings without a battery so they will not rust, or how to whiten them by dipping? A. To copper iron castings, the articles must be made perfectly clean, and then dipped in a solution of 1½ pounds copper sulphate in water to which 1 ounce sulphuric acid has been added. They are then washed and dried.

(8711) D. E. asks: Please let me know if there is a cheap and simple way to change 110-volt 1 1-5 ampere alternating current to a steady current? A. A rotary transformer is the only practical way to change an alternating to a direct current. This is a motor run by the alternating current and having a winding leading to a commutator, by which the direct current is taken off at the other end of the shaft of the machine.

(8712) H. B. says: 1. I have a closed-circuit battery in which there are two plates of carbon and one plate of zinc. What would be the solution I could use in this battery to best advantage? A. Use a bichromate solution or a chromic acid solution. 2. In winding the field magnet and the armature core of an electric motor, is it absolutely necessary that the same gage wire be used? That is, must the wire on the field be the same size as the wire on the core? A. No. The gage of wire is determined by calculation and one may be either larger, the same size or smaller than the other.

(8713) W. H. asks: Please give me the best formula for a dry primary battery. A. One of the best dry cells is said to be filled with the following mixture: Oxide of zinc, 1 part by weight; sal-ammoniac, 1 part; plaster of Paris, 3 parts; chloride of zinc, 1 part; water, 2 parts.

(8714) J. H. asks: 1. In a transformer supplied with a two or three-phase current how does the winding differ in said transformer from a single-phase? Is there only one primary circuit? A. A transformer may have any one of several forms of winding for its secondary, on two and three phase currents. In America it is common to use a separate transformer in each phase of a three-phase circuit. Many diagrams of connections and wiring may be found in Sheldon's "Alter-

(Continued on page 243)