

THE LITERARY REVOLUTION.—HISTORY.

On another page will be found advertised Macaulay's England, in three volumes, Knight's England, in four double volumes, Gibbon's Rome, in five volumes, and other standard histories, at prices which place them within easy reach of thousands who could never before reconcile their literary longings with their scanty belongings. The prices are now the marvel. At first readers doubt if they are real; then if the books are well made; for no previous experience shows that books can be at once good and cheap. When actual inspection demonstrates that they are well printed from good type, on fair white paper, and are bound neatly and durably, then the marvel is that the thing can be done. For the publishers deny that they are giving their wares away. They have simply adopted a system by which the eager crowd that wants their books get with them whatever advantage may accrue from large editions, cash sales, and the abrogation of the long series of intermediate profits that usually lie between the maker and the buyer.

Type setting by steam lends its aid. The compositor sits before his lettered key-board like an organist at his desk; the types, responsive to the call of his deft fingers, step out into the ever-growing file, whence a second workman takes the ranks that march in solid column down the printed page. Brains guide this machine, but the distributor is entirely automatic, assorting the letters swiftly with the utmost precision.

Although history is prominent in this advertisement, the issues of the AMERICAN BOOK EXCHANGE include many other works of standard merit. Descriptive catalogues of books now ready, and of important additions to be made at no distant day, will be cheerfully sent to any address. —Adv.

Business and Personal.

The Charge for Insertion under this head is One Dollar a line for each insertion; about eight words to a line. Advertisements must be received at publication office as early as Thursday morning to appear in next issue.

The publishers of this paper guarantee to advertisers a circulation of not less than 50,000 copies every weekly issue.

Send stamp for Illustrated Descriptive Price List of the Step Ladder, Ironing Table, and Clothes Drier. An ingenious combination. Useful in hotels, laundries, and every household, in every climate. See description in No. 12, Vol. 42, SCIENTIFIC AMERICAN. J. H. Martin, Hartford, New York.

Best and cheapest Piston Water Meter; also machines for setting tires cold by hand or power. Send for circular. J. B. West, Rochester, N. Y.

Wanted—30 H. P. Portable Engine; new or 2d hand. Address Colman Bros., South Coventry, Conn.

Makers of Thermo-static Apparatus for Controlling Valves, address A. Stamm, Box 1998, Leadville, Col.

The Brown Automatic Cut-off Engine; unexcelled for workmanship, economy, and durability. Write for information. C. H. Brown & Co., sole manufacturers, Fitchburg, Mass.

Wanted—Straw Braiding Machines for Hats, Mats, or Bonnets, and Hand Knitting Machines. Address 374 Atwater St., Detroit, Mich.

The handsomest Pens made are the Gold Plated Pens by the Esterbrook Steel Pen Co., 26 John St., New York. Price \$2 per gross.

Catalogue of Useful Books on Applied Science sent free. E. & F. N. Spon, 446 Broome St., New York.

Telephones.—Inventors of Improvements in Telephones and Telephonic Apparatus are requested to communicate with the Scottish Telephonic Exchange, Limited, 34 St. Andrew Square, Edinburgh, Scotland. J. G. Lorrain, General Manager.

Makers of Machines for making Wagon Spokes, Rims, etc., address C. D. Rathbone, Belpre, Ohio.

Blake Lion and Eagle Imp'd Crusher. See adv. p. 236.

Wanted.—Foreman of Machine Shop; one accustomed to fitting hardware or light work; also Metal Pattern Maker, familiar with the gating of small patterns. Apply to St. Louis Malleable Iron Co., St. Louis, Mo.

The genuine Asbestos Roofing (with white or gray Fireproof Coating), now in use in all parts of the world, is the only reliable substitute for tin. It is adapted for steep or flat roofs in all climates. It costs only half as much as tin, and can be easily applied by any one. H. W. Johns Manufacturing Co., 87 Maiden Lane, sole manufacturers.

Experimental Machinery, prices fair, at Anderson Bros., Peekskill, N. Y.

For manufacturing sites, coke and gas coal lands, their qualities and prices, address Mellon Brothers, Pittsburgh, Pa.

Foundry and Machine Shops for sale. Established in 1846. Write for description to E. J. Hoen, Addison, Steuben Co., N. Y.

4 to 40 H. P. Steam Engines. See adv. p. 220.

Wanted—Glass and Tin Fruit Cans; large quantities. Send price lists to E. Buff Bay, Jamaica, West Indies.

Brass Castings; bottom prices. H. B. Morris, Ithaca, N. Y.

For Alcott's Improved Turbine, see adv. p. 204.

Boiler Feed Pump, with tight and loose pulleys; sure to work. Price \$32. York & Smith, Cleveland, O.

Boat Engines, for sidewheel boats drawing 6 to 12 in; direct acting; link motion; cheap. Box 559, Owego, N. Y.

For Sale.—Four Boilers, 100 horse power each, return drop flue; A 1 condition; \$1,500 each. 1 Berryman Heater, 42 x 96; A 1 condition; \$400. D. L. Einstein, 16 White St., New York.

Cormugated Traction Tire for Portable Engines, etc. Sole manufacturers, H. Lloyd, Son & Co., Pittsburgh, Pa.

Spokes and Rims, white oak and hickory, best quality, to any pattern, and Hammer Handles of best hickory. John Fitz, Martinsburg, West Va.

For the best Stave, Barrel, Keg, and Hogshead Machinery, address H. A. Crossley, Cleveland, Ohio.

Collection of Ornaments.—A book containing over 1,000 different designs, such as crests, coats of arms, vignettes, scrolls, corners, borders, etc., sent on receipt of \$2. Palm & Fechteler, 403 Broadway, New York city.

Best Oak Tanned Leather Belting. Wm. F. Forepaugh, Jr., & Bros., 581 Jefferson St., Philadelphia, Pa.

National Steel Tube Cleaner for boiler tubes. Adjustable, durable. Chalmers-Spence Co., 40 John St., N. Y.

Split Pulleys at low prices, and of same strength and appearance as Whole Pulleys. Yocom & Son's Shafting Works, Drinker St., Philadelphia, Pa.

Stave, Barrel, Keg, and Hogshead Machinery a specialty, by E. & B. Holmes, Buffalo, N. Y.

Solid Emery Vulcanite Wheels—The Solid Original Emery Wheel—other kinds imitations and inferior. Caution.—Our name is stamped in full on all our best Standard Belting, Packing, and Hose. Buy that only. The best is the cheapest. New York Belting and Packing Company, 37 and 38 Park Row, N. Y.

Sheet Metal Presses, Ferracute Co., Bridgeton, N. J.

Nickel Plating.—Sole manufacturers cast nickel anodes, pure nickel salts, importers Vienna lime, crocus, etc. Condit, Hanson & Van Winkle, Newark, N. J., and 92 and 94 Liberty St., New York.

Wright's Patent Steam Engine, with automatic cut-off. The best engine made. For prices, address William Wright, Manufacturer, Newburgh, N. Y.

Presses, Dies, and Tools for working Sheet Metal, etc. Fruit & other can tools. Bliss & Williams, B'klyn, N. Y.

Bradley's cushioned helve hammers. See illus. ad. p. 238.

Forsyth & Co., Manchester, N. H., & 213 Centre St., N. Y. Bolt Forging Machines, Power Hammers, Comb'd Hand Fire Eng. & Hose Carriages, New & 2d hand Machinery. Send stamp for illus. cat. State just what you want.

Electrical Indicators for giving signal notice of extremes of pressure or temperature. Costs only \$20. Attached to any instrument. T. Shaw, 915 Ridge Ave., Phila.

Instruction in Steam and Mechanical Engineering. A thorough practical education, and a desirable situation as soon as competent, can be obtained at the National Institute of Steam Engineering, Bridgeport, Conn. For particulars, send for pamphlet.

Hydraulic Jacks, Presses and Pumps. Polishing and Buffing Machinery. Patent Punches, Shears, etc. E. Lyon & Co., 470 Grand St., New York.

Portable Forges, \$12. Roberts, 107 Liberty St., N. Y. Telephones repaired, parts of same for sale. Send stamp for circulars. P. O. Box 205, Jersey City, N. J.

Eclipse Portable Engine. See illustrated adv., p. 222.

For best low price Planer and Matcher, and latest improved Sash, Door, and Blind Machinery, send for catalogue to Rowley & Hermance, Williamsport, Pa.

Silent Injector, Blower, and Exhauster. See adv. p. 238.

Steam Engines, Boilers, Portable Railroads, Sugar Mills. Atlantic Steam Engine Works, Brooklyn, N. Y.

Planing and Matching Machines, Band and Scroll Saws, Universal Wood-workers, Universal Hand Jointers, Shaping, Sand-papering Machines, etc., manuf'd by Bentel, Margedant & Co., Hamilton, Ohio. "Illustrated History of Progress made in Wood-working Machinery," sent free.

Fire Brick, Tile, and Clay Retorts, all shapes. Borgner & O'Brien M'rs, 23d St., above Race, Phila., Pa.

Peck's Patent Drop Press. See adv., page 236.

Chase's Pipe Cutting & Threading Machine. Send for circular. Chase Machine Co., 120 Front St., New York.

The Chester Steel Castings Co., office 407 Library St., Philadelphia, Pa., can prove by 15,000 Crank Shafts, and 10,000 Gear Wheels, now in use, the superiority of their Castings over all others. Circular and price list free.

Brass & Copper in sheets, wire & blanks. See ad. p. 205.

Diamond Engineer, J. Dickinson, 64 Nassau St., N. Y.

The Improved Hydraulic Jacks, Punches, and Tube Expanders. R. Dudgeon, 24 Columbia St., New York.

For Superior Steam Heat. Appar., see adv., page 237.

We will purchase or manufacture on royalty, patented articles of real merit. Farley & Richards, Phila., Pa.

Valve Refitting Machine. See adv., page 238.

Cut Gears for Models, etc. Models, working machinery, experimental work, manufacturing, etc., to order. D. Gilbert & Son, 212 Chester St., Phila., Pa.

Holly System of Water Supply and Fire Protection for Cities and Villages. See advertisement in SCIENTIFIC AMERICAN of last week.

The E. Horton & Son Co., Windsor Locks, Conn., manufacture the Sweetland Improved Horton Chuck.

Special Wood-Working Machinery of every variety. Levi Houston, Montgomery, Pa. See ad. page 238.

The Best Truss ever used. Send for descriptive circular to N. Y. Elastic Truss Co., 638 Broadway, New York.

Inventors' Institute, Cooper Union. A permanent exhibition of inventions. Prospectus on application. 733 Broadway, N. Y.

For Reliable Emery Wheels and Machines, address The Lehigh Valley Emery Wheel Co., Weissport, Pa.

Comb'd Punch & Shears; Universal Lathe Chucks. Lambertville Iron Works, Lambertville, N. J. See ad. p. 108.

Improved Steel Castings; stiff and durable; as soft and easily worked as wrought iron; tensile strength not less than 65,000 lbs. to sq. in. Circulars free. Pittsburg Steel Casting Company, Pittsburg, Pa.

New Economizer Portable Engine. See illus. adv. p. 206.

Cutters shaped entirely by machinery for cutting teeth of gear wheels. Pratt & Whitney Co., Hartford, Conn.

Hand Fire Engines, Lift and Force Pumps, for fire and all other purposes. Address Rumsey & Co., Seneca Falls, N. Y., and 93 Liberty St., N. Y. city, U. S. A.

For Shafts, Pulleys, or Hangers, call and see stock kept at 79 Liberty St., N. Y. Wm. Sellers & Co.

Wm. Sellers & Co., Phila., have introduced a new injector, worked by a single motion of a lever.

Ore Breaker, Crusher, and Pulverizer. Smaller sizes run by horsepower. See p. 236. Totten & Co., Pittsburg.

NEW BOOKS AND PUBLICATIONS.

DEUTSCH-AMERIKANISCHE APOTHEKER-ZEITUNG. A semi-monthly gazette devoted to the interests of Apothecaries, Physicians, Chemists and Druggists. New York: Pharmaceutical Publishing Company, 5 Gold street. Price \$2.50 a year.

The first issue of this new periodical is well printed on Roman type, and contains a number of articles of interest and value to German reading apothecaries and druggists, a price list of drugs and chemicals, and a report of the drug market. It has sixteen pages about three-fourths the size of the SCIENTIFIC AMERICAN, and bears evidence of ability and vitality enough to give it an honorable rank among trade journals.

RESPONSIBILITY RESTRICTED BY INSANE DELUSION. By T. L. Wright, M.D. Paper, pp. 16. Reprint from Cincinnati Medical News.

Dr. Wright's conclusions are that the partially insane should be held responsible for crime; that the degree of responsibility attaching to the acts of the monomaniac is less than that which belongs to sound minds; and that capital punishment should never be visited upon one infected with any taint of lunacy.

THE AMERICAN HOUSE BUILDER. By R. G. Hatfield. Edited by O. P. Hatfield. New York: John Wiley & Sons. 8vo, cl., pp. 685. Price \$5.

This is the eighth edition of the well known treatise on the art of building by the late Mr. Hatfield. During the last year of his life the author thoroughly revised his work and rewrote a large part of it, making many additions. The new volume is published in the same style as the author's work on "Transverse Strains."

KEY TO GHOSTISM. SCIENCE AND ART UNLOCK ITS MYSTERIES. By Rev. Thomas Mitchell. New York: S. R. Wells & Co.

A curious book which, while it exposes in a way the absurdities of "ghostism," still seems to leave the author in a mental condition scarcely more creditable than that of the victims of the delusion he combats. The sciences of the work is of that amazing kind, which has not even a ghost of the spirit of true science about it, let alone any material basis.

UBER DIE VERWERTHUNG DER LINIEN GLEICHER HOHE FÜR BERGBAU. Forst, Land-, und Volkswirtschaft und deren Wichtigkeit für die Fruchtbarkeit und den Wasserreichthum sowie den Verkehrslines Landes. Von K. Ludolf. Prague: H. Dominicus. Pp. 32. 1878.

Treats of the use of lines of equal height in mining, forest culture, national economy, etc., meaning by the term, lines following the contour of the earth's surface, but always preserving the same level. For example, to maintain the level of a mill race or aqueduct without viaducts or tunnels, the channel must be carried around all the curvatures of hill and valley, its course forming a line of equal height. The author points out the applications and usefulness of such lines in the several varieties of engineering work.

ARCHIMEDES' LEVERS: THE FULCRUM FOUND BY WILL POWERS. Philadelphia: G. W. Townsend.

A packet of slips of note paper, along the margins of which are printed these words: 1. The Cause or Source? 2. Its Essentials? 3. Associated with? 4. Its Incidents? 5. It Illustrates? 6. Its Effects? 7. Conclusions? These seven "levers" the student is expected to use in the analysis of subjects suggested or taught in newspaper articles, books, etc. Habits of critical note-taking are well worth cultivating; and these slips might be handy for such work. The suspicion, however, that the author has experimented with the "levers" and thereby acquired the style of writing and thinking shown by him on the cover of the packet, will be likely to prevent any large use of them.

THE FIELD ENGINEER. By William Findlay Shunk, C. E. New York: D. Van Nostrand.

A handy (pocket) book of practice in the survey, location, and track work of railroads, prepared with special reference to the wants of young engineers who have not had the advantage of a technical education.

A PRACTICAL TREATISE ON NERVOUS EXHAUSTION (NEURASTHENIA), ITS SYMPTOMS, NATURE, SEQUENCES, AND TREATMENT. By George M. Beard, M.D. New York: William Wood & Co.

Dr. Beard writes as a specialist for the practical instruction of general practitioners of medicine, his aim being, in his own words: To describe with thoroughness, if not exhaustively, the symptoms of neurasthenia—those hitherto assigned to other affections, or regarded as special and distinct diseases, to show their relations and interdependence; to distinguish them from the oftentimes closely resembling symptoms of organic disease on the one hand, and the symptoms of hysteria and hypochondria on the other; to unify and harmonize the complex developments and manifestations of this malady; to indicate its pathology and rationale; and to trace out in detail its prognosis, sequences, treatment, and hygiene. "The hygiene of nervous diseases has three gospels—rest, work, and change of work."



HINTS TO CORRESPONDENTS.

No attention will be paid to communications unless accompanied with the full name and address of the writer.

Names and addresses of correspondents will not be given to inquirers.

We renew our request that correspondents, in referring to former answers or articles, will be kind enough to name the date of the paper and the page, or the number of the question.

Correspondents whose inquiries do not appear after a reasonable time should repeat them. If not then published, they may conclude that, for good reasons, the Editor declines them.

Persons desiring special information which is purely of a personal character, and not of general interest, should remit from \$1 to \$5, according to the subject, as we cannot be expected to spend time and labor to obtain such information without remuneration.

Any numbers of the SCIENTIFIC AMERICAN SUPPLEMENT referred to in these columns may be had at this office. Price 10 cents each.

(1) G. W. D. asks: What is the rule for determining the size of steam ports, the area of piston

being known? A. Generally from one-ninth to one eighteenth the area of the piston, depending upon the pressure of steam and velocity of the piston.

(2) W. T. B. asks: Which has the most brains, the best chemist in the world or the best carpenter? A. We do not know of any carpenters who have ranked so high as the "best chemists," on the score of brain, capacity, power, and learning. Certainly chemistry calls for a higher and wider range of exact knowledge and greater mental power and acuteness than carpentry does; and for quite as much manual skill.

(3) L. H. McF. asks: 1. Ought pure alcohol be used for preserving natural history specimens? A. Spirit of wine will answer as well as strong alcohol. 2. Will methylic or wood alcohol answer the purpose? A. Yes; in some cases alcohol is preferable.

(4) O. R. R. asks: 1. Is there any way known of keeping milk without retaining it somewhat in bulk? A. Milk has been preserved for some time by the addition to it of salicylic acid in the proportion of ten or twelve grains to the quart; also by the use of iodate of calcium. Neither of these, however, are desirable in milk. 2. If a method could be discovered by which this could be done would it be of any great value? A. Very probably.

(5) R. S. M. asks: 1. If a pipe be laid five miles long over hills and down valleys, the fall being ten feet to the mile, or 50 feet total, and the pipe be kept full of water at the upper end, would the pipe be full at the lower end? I say not: am I right? A. If we understand your question, you are correct. 2. Would not the water all pass through a pipe one half the size, the last, say, 100 feet? If not, what proportion? A. The size of pipe at the lower end, to discharge all the water supplied from the upper end, will depend upon the total length of the pipe, and the number and character of the bends. 3. Would not the water flow more freely on a gradual grade than moving up and down with the hills? A. Yes.

(6) E. H. W. writes: In your issue of the SCIENTIFIC AMERICAN of March 30, under the head of "Notes and Queries," No. 22, S. G. asks about making a small engine cylinder of Babbitt metal. You directed him to use a piece of brass tubing instead, which corresponds with my idea of a small cylinder. I just successfully completed an engine a few weeks ago, cylinder 13-16 inches diameter by 2 1/4 inches stroke, with brass tube for bore of cylinder, and with Babbitt metal cast around it in the form necessary. It is a slide valve engine. Have not applied it to any machinery yet, but feel confident it will run several sewing machines at once.

(7) S. B. H. asks: Can the chemicals and impurities of a negative bath be identified by the help of a microscope, either in the solution or after evaporation? A. The microscope would be of little service in this connection.

(8) W. E. A. writes: I have been trying to make an imitation amber, for manufacturing purposes, but can't get it just right. Can you give me a formula or some hints in regard to it? A. A fictitious amber is prepared by melting pure bleached shellac, and keeping it over the fire until it runs clear, with care to prevent burning. It may be poured into moulds of the size of pieces required. The operation requires considerable management. The darkest and hardest pieces of gum copal are also substituted for amber. The copal may be fused with the shellac.

(9) I. P. asks: 1. How many pounds of cast iron can I melt in a crucible in a brass furnace? A. 10 or 12 lb. can be handled very well. 2. How many melts can I make in a crucible before danger of cracking? A. If carefully handled, two or three. 3. What must I use for a flux for cast iron? A. A little borax, or charcoal and carbonate of soda. These are not essential. 4. What can I add to scrap to make a soft casting? A. Powdered iron ore—iron rust.

(10) G. P. P. asks (1) where to find directions for making a small electric motor. A. In article on "An Electrical Cabinet," in SUPPLEMENT No. 191. 2. How can I make an Edison loud speaking telephone? A. See p. 198, vol. 41, SCIENTIFIC AMERICAN. 3. What is the chemical reaction when the solution for chemical telegraph is decomposed by electricity, the positive electrode being of iron? (The solution is the same as described on page 124 (24), Vol. 41, SCIENTIFIC AMERICAN.) A. Ferric oxide is formed, which combines with the potassium ferrocyanide forming Prussian blue (Fe₄Cy₁₆).

(11) H. A. R. asks how to make the best stove polish. A. Use pure graphite (plumbago) reduced to a fine powder and made into cakes by strong pressure.

MINERALS, ETC.—Specimens have been received from the following correspondents, and examined, with the results stated:

S. P.—The mineral is a micaceous hematite; it is a valuable ore of iron readily mined and in large quantities.—J. D. C.—No. 1 is a good sample of argentiferous galena. The property is probably valuable. No. 2 is carbonate of lime.—M. F. B.—The sample is fool's gold and contains none of the precious metals.—J. L. H.—The substance is mica and if in larger plates would find a ready market.—T. X. O.—No. 1 is a lead carbonate carrying silver. An assay would be advisable. No. 2 is decomposed granite.—L. S.—The ore is evidently a selected specimen. It is worth about \$300 per ton.—R. C. G.—They are not diamonds but quartz pebbles. No. 2 is worn by water. No. 3 is not a mineral but a fragment of shell.—H. B.—The substance is a green marl and is much used as a fertilizer.—J. B. S.—It is not malachite but hardened green paint.—R. & Co.—Sample in green box. No. 1 is iron pyrites in shale. No. 2 is chrome iron ore.—M. E. C.—Copper and iron sulphurets probably carrying a little silver.—J. H. V.—Quartz, iron sulphide, fluor spar. An assay would be necessary to ascertain the presence or absence of the precious metals.

COMMUNICATIONS RECEIVED.

On Cotton Pickers. By I. J. M.

On Spontaneous Combustion. By J. T. R.

On Perpetual Motion. By H. S. B.