

Founded by Matthew Carey, 1785.

HENRY CAREY BAIRD & CO. INDUSTRIAL PUBLISHERS, BOOKSELLERS & IMPORTERS 810 Walnut St., Philadelphia, Pa., U. S. A.

Our New and Revised Catalogue of Practical and Scientific Books, 88 pages, 8vo, and our other Catalogues and Circulars, the whole covering every branch of Science applied to the Arts, sent free and free of postage to any one in any part of the world who will furnish his address.

Latest Scientific Publications.

AN INTRODUCTION TO THE STUDY OF METALLURGY.

Third edition, revised and enlarged. By W. C. Roberts-Austen, C.B., F.R.S., Professor of Metallurgy in the Royal College of Science, Chemist and Assayer of the Royal Mint. Illustrated. 8vo, cloth. Price, \$4.00

THE METALLURGY OF GOLD. By T. Kirke Rose, B.Sc., Associate of the Royal School of Mines. Edited by Professor W. C. Roberts-Austen, C.B., F.R.S. With numerous illustrations. 1 vol. 8vo. Price.....\$6.50

ORE AND STONE MINING. A Textbook of. For the use of Mine Owners, Mine Managers, Prospectors, and all interested in Ore and Stone Mining. By Clement Le Neve Foster, D. Sc., F.R.S., Professor of Mining, Royal College of Science, H. M. Inspector of Mines. With 700 illustrations. Large 8vo. Price.....\$10.00

THE WATER SUPPLY OF TOWNS AND THE CONSTRUCTION OF WATERWORKS. A Practical Treatise for the use of Engineers and Students of Engineering. By W. R. Burton, Assoc. Inst. C.E., Professor of Sanitary Engineering in the Imperial University, Tokio, Japan, etc. To which is appended a Paper on "The Effects of Earthquakes on Waterworks," by Professor John Milne, F.R.S. Large 8vo, with 257 illustrations and 44 plates. Price.....\$9.00

ELECTRICITY AND MAGNETISM. By C. G. Knott, D.Sc. (Edin.). 12mo, cloth. Price 75c.

DICTIONARY OF THE ACTIVE PRINCIPLES OF PLANTS. By Charles E. S. F. C. S. Alkaloids, Bitter Principles, Glucosides: their Sources, Nature and Chemical Characteristics; with Tabular Summary, Classifications of Reactions, and full Botanical and General Indexes. Crown 8vo, cloth. Price.....\$3.00

THE NEW UNITED STATES DISPENSARY. Seventeenth edition. By Professors Wood, Remington and Sadtler. The 17th edition of this indispensable guide and authority has been carefully and thoroughly revised upon the basis of the New Pharmacopoeia by the editors, Professors Wood, Remington and Sadtler. 1974 pages, with original illustrations. Price, cloth extra, \$4.00; leather \$6.00; half Russia, \$9.00. Patent Index, 50 cents additional.

SOI LICE AND MODE OF SOLAR ENERGY. By J. W. Heysinger, M.D. Illustrated. 12mo, cloth. Price.....\$1.50

For sale by all Booksellers, or will be sent direct by the Publishers, J. B. LIPPINCOTT COMPANY, Philadelphia, Pa.

VANDUZEN STEAM PUMP THE BEST IN THE WORLD. Pumps Any Kind of Liquid. Always in Order, never Clogs nor freezes. Every Pump Guaranteed. 10 SIZES. 200 to 12000 Gallons per Hour. Cost \$7 to \$75 each. Address THE VANDUZEN & TIFT CO., 102 to 108 E. Second St., Cincinnati, O.

Model & Experimental Work. Absolute secrecy. Address and ideas not charged for. Send for particulars to GARDAM & SON, 36 John Street, New York.

BARNES' New Friction Disk Drill. FOR LIGHT WORK. Has these Great Advantages: The speed can be instantly changed from 0 to 1600 without stopping or shifting belts. Power applied can be graduated to drive with equal safety the smallest or largest drills within its range—a wonderful economy in time & a great saving in drill breakage. Send for catalogue. W. F. & JNO. BARNES CO., 1999 Ruby St., Rockford, Ill.

RECENTLY PUBLISHED.



THE MANUFACTURE OF Liquors and Preserves.

By J. DE BREVANS. PRICE \$3.00, POSTPAID.

The author is an eminent French chemist who has devoted much time and study to the preparation of Liquors and Preserves. The great value of the work consists in the formulas, which number over 300, and are so arranged that, if the manufacturer has no distilling plant of his own, he can still make many of the liquors from the essences. The manufacture of French liquors, etc., from essences is very profitable and does not require large capital. The raw materials, the plant of the distiller, etc., are described according to the best modern practice. The book has 65 illustrations, 18 tables, and a full index.

Send for Table of Contents. MUNN & CO., Publishers, SCIENTIFIC AMERICAN OFFICE, 361 Broadway, New York.



"THE DENSMORE"

"The World's Greatest Typewriter." Lightest touch which means least fatigue. With fewer parts than others attains more ends. The material and workmanship insure durability. Adopted by the United States War Department. FREE—Descriptive Pamphlet containing testimonials from leading concerns. DENSMORE TYPEWRITER CO., 202 Broadway, New York.

TO INVENTORS. E. Konigslow, Manufacturer of Fine Machinery and Models, offers Special Facilities to Inventors. Guarantees to work out ideas in strictest secrecy, and any improvement that he can suggest goes with the work. Thousands of men have crude though really valuable ideas, which they lack mechanical training to develop. Novelities and patented articles manufactured by contract. 181 Seneca St., Cleveland, Ohio.

BUY THE FOX SAFETY RAZOR AND STROP MACHINE AND NO OTHER. You Cannot Cut Yourself. A Delicious Shave. No Skin Disease. A CONTINUAL ECONOMY. Lasts a Lifetime. Razor, \$2.00. Machine and Strop, \$1.75. Both in one box, \$3.75. ASK YOUR DEALER. E. LOTHAR SCHMITZ, 92 Rusk St., New York.

MATCH * MACHINERY.

Latest improved. Complete plants furnished. J. O. S. DONNELLY, 1209 Buttonwood Street, Philadelphia, Pa.

"ECLIPSE" GRAVER, DRILL & TOOL SHARPENER

For holding tools of every description, for sharpening. Adjustable to any angle. Most practical, economical and indispensable tool for the purpose. Tools last longer, retaining accurate cutting edges at all times. Price \$1.75. For Sent for illustrated circular. E. F. BOWMAN & CO., 20 to 26 Chestnut St. Lancaster, Pa., Mfrs. of Engravers' Watchmakers' and Jewelers' Tools and Supplies.

Messrs. MUNN & Co., Solicitors of Patents, have had nearly fifty years' continuous experience. Any one may quickly ascertain, free, whether an invention probably is patentable by writing to MUNN & Co. Communications strictly confidential. A handbook of patents and how to obtain them sent free. PATENTS taken through MUNN & Co. receive special notice in the Scientific American. This splendid weekly paper, elegantly illustrated, has the largest circulation of any scientific work, \$3 a year. Specimen copies free. Address MUNN & CO., New York, 361 Broadway.

TYPE WHEEL MACHINES FOR SMALL WORKS, NOVELTIES & ETC. NEW YORK STEEL WORKS 100 NASSAU ST. N.Y.

USEFUL GANE. A cane has been invented, that gives at a glance the height or distance on land or water. Parties desiring to purchase or manufacture it, will please address RIX & 373, Ft. Wayne, Ind. See pat. 506,383, Sept. 19, 1893.

THE FISHER Patent Steam Pump Governors For Steam Pumps Working under Pressure and the FISHER PATENT GRAVITY GOVERNORS For Steam Pumps filling elevated open tanks, are the most positive and durable devices made for the purpose. REDUCING VALVES. Send for circulars and testimonials. FISHER CO. ENGINEERS, 201 S. 1st Avenue, Marshalltown, Iowa.

CONTRACTS WANTED.

To manufacture Hardware Specialties, Pat'd Novelties and Sheet Metal Stamping. Latag Mfg. Co., Racine, Wis.

MY WIFE CANNOT SEE HOW YOU DO IT AND PAY FREIGHT. Buy our 2 drawer walnut or oak Improved High Arm Singer Sewing Machine. Fully finished, nickel plated, adapted to light and heavy work, guaranteed for 10 Years; with Automatic Bobbin Winder, Self-Threading Cylinder Shuttle, Self-Betting Needle and a complete set of Best Attachments shipped any where on 30 Day's Trial. No money required in advance. 75,000 now in use. World's Fair Medal awarded machine and attachments. Buy from factory and save dealer's and agent's profits. FREE. Cut This Out and send today for machine or spare free catalogue, testimonials and Circulars of the World's Best. OXFORD MFG. CO. 342 Wabash Ave. CHICAGO, ILL.

WOODEN TANKS.

For Railroads, Mills and Manufacturers. Builders of Steel Towers and Tanks. La. Red Cypress Wood Tanks a specialty. W. E. CALDWELL CO., 217 E. Main Street, Louisville, Ky.

THE "OLIN" GAS AND GASOLINE ENGINES, FROM 1 TO 10 HORSE POWER, FOR ALL POWER PURPOSES. THE OLIN GAS ENGINE CO., 222 CHICAGO STREET, BUFFALO, NEW YORK. Huggles-Coles Engineering Co., 39-41 Cortlandt Street, New York, Agents.

Don't Kill Yourself SMOKING. Use the HARMLESS SMOKER CURE NO SMOKE IN THE MOUTH. It retains all the flavor and enjoyment of smoking a cigar without the injury. Can be used for cigarette smoking and makes it absolutely harmless as it prevents inhaling; also aids to quit the habit when desired. Send for free circular even if you are skeptical. RYERSON D. CATES, B. 1206, 108 La Salle St., Chicago.

DEAFNESS & HEAD NOISES CURED by INVISIBLE Tubular Castles. Have had more to cure than all other devices combined. Write for FREE HELP. F. HILGEMAN, 558 S. 3rd St., N.Y. Book of proof FREE

THE SIMPLEX TYPEWRITER \$250 GUARANTEED. To do as good work as any high priced machine. Specially adapted for use in private correspondence. Sent by mail or express prepaid on receipt of \$2.00. Inadequate without case, U.C. extra. Address Simplex Typewriter Co., 20 E. 18th St., New York

How To Make a Dynamo OR MOTOR. 1/2 horse power size, illustrated with full working drawings. By Edw. Treverton. Price 10c. Bubier Publishing Co., Lynn, Mass.

GAS AND GASOLINE ENGINES FOR ELECTRIC LIGHTING, PUMPING, AND ALL SMALL POWER PURPOSES. LAUNCH ENGINES AND LAUNCHES. VAPOR ENGINE MONITOR AND POWER COMPANY, ERIE ST., GRAND RAPIDS, MICHIGAN. SEND FOR CIRCULAR.

HYPNOTISM: Its Uses and Abuses. The science easily acquired by anyone. Illus'd book, \$1. Dr. Anderson, S.A.10, Masonic Tem. Chicago

MODEL and Experimental Work at moderate prices. Dynamos and Motors repaired. Armatures rewound. All kinds of Electrical Appliances made. C. R. NETHING, 143 Centre St., New York.

YOU CAN BECOME A WATCHMAKER. And establish yourself in a paying business, by securing our set of tools and instruction book. All first-class Jeweler's tools. Book tells you how to use them—makes success easy. Book and Tools \$4.75. (see picture). Sent by express on receipt of price \$4.75. C. O. D. where \$1.00 accompanies the order. Send for our price list. HOFMAN SUPPLY CO., Wholesale Dealers in WATCHMAKING TOOLS AND SUPPLIES, 155 Bay St., Columbus, Ohio.

RECEIVER'S SALE. The entire plant and good will of the Stark Machine and Tool Co., including real estate, tools, machinery, patterns, etc., also thousands of orders on hand. This plant is located at the corner of Hudson and Seventh Sts., Buffalo, N. Y., and consists of a four story brick building fully equipped for the manufacture of tinners' machines and tools, machinery for working sheet metal, presses, dies, etc. The factory is now in operation, and all information in reference to same cheerfully given. Address MICHAEL NEWELL, Receiver, cor. Hudson and Seventh Sts., Buffalo, N. Y.

The Most Useful Tool in any Shop is the RIVETT LATHE MADE BY FANEUIL WATCH TOOL CO. BRIGHTON, BOSTON, MASS., U. S. A. Anybody interested, write for particulars. The Highest Award at the World's Columbian Exposition.

TURBINES. Send for Pamphlet. JAMES LEFFEL & CO., Springfield, Ohio, U. S. A.

INCUBATORS. The Improved, SELF-REGULATING, "OLD RELIABLE" Has no superior. World's Fair Medal. Write for catalogue for 1894. Poultry and Farm Supply Co., 100 N. 3rd St., Philadelphia, Pa.

FOR SALE. Valuable Patent Right. Large profits, easy of manufacture. 93 Bartlett St., Rochester, N. Y.

MAGIC LANTERNS WANTED OR FOR SALE. HARBACH & CO. 809 Filbert St. Phila. Pa.

THE LINK-BELT COMPANIES, PHILADELPHIA, NEW YORK, CHICAGO. Originators of the best practice in the use of Link-Belt of standard designs. Ewart Link-Belt (31 regular sizes). Sprocket Wheels, Rope Transmissions, Fibre-Graphite Self-Lubricating Journal Bearings. Machinery for elevating and conveying any material. Philadelphia address, 2020 Hunting Park Av.

SHORTHAND BY MAIL. Taught by Reporters. Catalogue and first lesson FREE. POTTS' SHORTHAND COLLEGE, Academy B'k, Williamsport, Pa.

HE IS DEAD

To his own interest, who deals in Arms and Ammunition or who shoots a Rifle Pistol, or shot Gun, and has not a copy of IDEAL HAND BOOK, No. 1, A 84 pages of solid information. Just out. (Mention Scientific American) BE ALIVE and FREE all copies. IDEAL MFG. CO., Drawer 886, New Haven, Conn., U. S. A.

Architectural Books

Useful, Beautiful and Cheap.

Any person about to erect a dwelling house or stable, either in the country or city, or any builder wishing to examine the latest and best plans for a church, school house, club house, or any other public building of high or low cost, should procure a complete set of the ARCHITECTS' AND BUILDERS' EDITION of the SCIENTIFIC AMERICAN.

The information these volumes contain renders the work almost indispensable to the architect and builder, and persons about to build for themselves will find the work suggestive and most useful. They contain colored plates of the elevation, plan, and detail drawings of almost every class of building, with specification and approximate cost.

Seventeen bound volumes are now ready and may be obtained, by mail, direct from the publishers or from any newsdealer. Price \$2.00 a volume. Stitched in paper covers. Subscription price, per annum, \$2.50. Address and remit to

MUNN & CO., Publishers, 361 Broadway, New York.

MALLEABLE CASTINGS FROM SPECIAL PATTERNS. THOMAS DEVLIN & CO. FINE TUNING JAPANING AND FINISHING. LEHIGH AVE. & AMERICAN ST. PHILA.

DEAFNESS

and HEAD NOISES relieved by using Wilson's Common Sense Ear Drum. New scientific invention, entirely different in construction from all other devices. Assist the deaf when all other devices fail, and where medical skill has given no relief. They are safe, comfortable, and invisible; have no wire or string attachment. Write for pamphlet. WILSON EAR DRUM MFG. CO., LOUISVILLE, KY.

SAFETY THRUST COLLARS. SOLID AND STIFF. Of character and at price to suit the most critical buyer. Dealers in shafting will consult their interests in writing for Price List and Discoups. THE GOVERNOR MACHINE CO., Gouverneur, N. Y.

VOLNEY W. MASON & CO. FRICTION PULLEYS, CLUTCHES, and ELEVATORS. PROVIDENCE, R. I.

TELESCOPES. W. & D. MOGEE, BAYONNE CITY, N. J.

HIGH GRADE ONLY. Warranted. Contractors desiring a trustworthy Jack Screw, address RUMSEY & Co., Ltd., Seneca Falls, N. Y.

Telephones

Sold outright. Cannot get out of order. Guaranteed free from infringement. Suitable for exchanges or private plants. Send for Testimonials and Prices. Some good territory left for reliable agents. MASON TELEPHONE CO., RICHMOND, VA.

A Valuable Book



12,500 Receipts. 708 Pages. Price \$5. Bound in Sheep, \$6. Half-Morocco, \$6.50.

This splendid work contains a careful compilation of the most useful Receipts and Replies given in the Notes and Queries of correspondents as published in the Scientific American during the past fifty years; together with many valuable and important additions.

Over Twelve Thousand selected Receipts are here collected; nearly every branch of the useful arts being represented. It is by far the most comprehensive volume of the kind ever placed before the public.

The work may be regarded as the product of the studies and practical experience of the ablest chemists and workers in all parts of the world; the information given being of the highest value, arranged and condensed in concise form convenient for ready use.

Almost every inquiry that can be thought of, relating to formulae used in the various manufacturing industries, will here be found answered.

Instructions for working many different processes in the arts are given.

Those who are engaged in any branch of industry probably will find in this book much that is of practical value in their respective callings.

Those who are in search of independent business or employment, relating to the home manufacture of valuable articles, will find in it hundreds of most excellent suggestions.

Send for Descriptive Circular. MUNN & CO., Publishers, SCIENTIFIC AMERICAN OFFICE, 361 Broadway, New York.