

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.

For Sale.—A Foundry and Machine Shop, with a Corn and Feed Mill, the whole driven by an automatic engine and boiler of 30 H. P. No other shop within a radius of 50 miles. The present owner will retain a one-half interest, if the purchaser will superintend the business. Address N. W. Girdwood, Asheville, N. C.

We wish to engage a first-class mechanical draughtsman; apply to Empire Refrigerating Company, 919 Olive Street, St. Louis, Mo.

Coverings for Steam Pipes, etc., etc.—We took occasion a few weeks since to call the attention of our readers to the advanced position occupied by the H. W. Johns Manufacturing Company of this city in the matter of non-conducting covering for steam pipes, boilers, etc., etc. That we were fully justified in doing this is manifested in the fact that the above company have very recently completed large contracts for the following named parties: Church & Co., Greenpoint; D. L. & W. R. Co., at Hoboken and Kingsland; Morris & Cummings Dredging Co.; Pennsylvania Railroad Co.'s new ferryboats, Baltimore and Chicago; Hotel Brandon, Park Avenue; United States New Barge Office; J. Ellis & Co., Edgewater, N. J.; Orange Waterworks, Orange, N. J.; Eagle Pencil Co., city; and many others.

Works by Tyndall, Huxley, Spencer, etc., 15 cts. each. I. Fitzgerald, 30 Lafayette Place, New York.

Railway and Machine Shop Equipment.

Send for Monthly Machinery List to the George Place Machinery Company, 121 Chambers and 103 Reade Streets, New York.

Scientific Books. See page 44. 100 page Catalogue free. E. & F. N. Spon, 44 Murray Street, N. Y.

Drop Forgings. Billings & Spencer Co. See adv., p. 45.

For Pat. Safety Elevators, Hoisting Engines, Friction Clutch Pulleys, Cut-off Coupling, see Frisbie's ad. p. 44.

Mineral Lands Prospected, Artesian Wells Bored, by Pa. Diamond Drill Co. Box 423, Pottsville, Pa. See p. 46.

Improved Skinner Portable Engines. Erie, Pa.

Contracts taken to Manuf. small goods in sheet or cast brass, steel, or iron. Estimates given on receipt of model. H. C. Goodrich, 66 to 72 Ogden Place, Chicago.

See New American File Co.'s Advertisement, p. 30.

Steam Pumps. See adv. Smith, Vaile & Co., p. 29.

Stone bottles for beer and ink. Merrill & Co., Akron, O. 257 Lathes of the best design. G. A. Ohl & Co., East Newark, N. J.

For Power & Economy, Alcott's Turbine, Mt. Holly, N. J.

"How to Keep Boilers Clean." Book sent free by James F. Hotchkiss, 84 John St., New York.

Engines, 10 to 50 horse power, complete, with governor. \$250 to \$350. Satisfaction guaranteed. More than seven hundred in use. For circular address Heald & Morris (Drawer 127), Baldwinville, N. Y.

Brass Finishers' Turret Lathes, 13 1/2 x 4, \$165. Lodge, Barrer & Co., 132 Pearl St., Cincinnati, O.

Wanted.—Patented articles or machinery to make and introduce. Gaynor & Fitzgerald, New Haven, Conn.

Latest Improved Diamond Drills. Send for circular to M. C. Bullock Mfg. Co., 80 to 88 Market St., Chicago, Ill.

Water purified for all purposes, from household supplies to those of largest cities, by the improved filters manufactured by the Newark Filtering Co., 177 Commerce St., Newark, N. J.

Assays and Analyses of ores and all commercial products. Advice given and investigations made in all branches of chemical industry. Send for circular. N. Y. Assay Laboratory, 40 Broadway, New York.

Guild & Garrison's Steam Pump Works, Brooklyn, N. Y. Steam Pumping Machinery of every description.

Combination Roll and Rubber Co., 68 Warren street, N. Y. Wringer Rolls and Moulded Goods Specialties.

First Class Engine Lathes, 30 inch swing, 8 foot bed, now ready. F. C. & A. E. Rowland, New Haven, Conn.

Ice Making Machines, and Machines for Cooling Breweries, etc. Pictet Artificial Ice Co. (Limited), 122 Greenwich Street. P. O. Box 3083, New York city.

Steel Stamps and Pattern Letters. The best made. J. F. W. Dorman, 21 German St., Baltimore. Catalogue free.

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

Perfect Self-ventilating Funnel. Patent for sale, or on royalty. Address G. M. Wickliffe, Brookneal, Va.

Cotton Belting and Rubber Belting; two, three, and four ply; all widths. Greene, Tweed & Co., New York.

Supplement Catalogue.—Persons in pursuit of information on any special engineering, mechanical, or scientific subject, can have catalogue of contents of the SCIENTIFIC AMERICAN SUPPLEMENT sent to them free. THE SUPPLEMENT contains lengthy articles embracing the whole range of engineering, mechanics, and physical science. Address Munn & Co., Publishers, New York.

Machinery for Light Manufacturing, on hand and built to order. E. E. Garvin & Co., 123 Center St., N. Y.

Presses & Dies, Ferracut Mach. Co., Bridgeton, N. J.

American Fruit Drier. Free Pamphlet. See ad., p. 61.

Am. Twist Drill Co., Meredith, N. H., make Pat. Chuck Jaws, Emery Wheels, Grinders, automatic Knife Grinders.

For best Portable Forges and Blacksmiths' Hand Blowers, address Buffalo Forge Co., Buffalo, N. Y.

Brass & Copper in sheets, wire & blanks. See ad. p. 61.

The Chester Steel Castings Co., office 407 Library St., Philadelphia, Pa. can prove by 20,000 Crank Shafts and 15,000 Gear Wheels, now in use, the superiority of their Castings over all others. Circular and price list free.

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

Machine Diamonds, J. Dickinson, 64 Nassau St., N. Y.

Tight and Slack Barrel Machinery a specialty. John Greenwood & Co., Rochester, N. Y. See illus. adv. p. 60.

Blake's Belt Studs. The strongest and best fastening for leather or rubber belts. Greene, Tweed & Co., N. Y.

Pays well on small investment.—Stereopticons, Magic Lanterns, and Views illustrating every subject for public exhibitions. Lanterns for colleges, Sunday-schools, and home amusement. 116 page illustrated catalogue free. McAllister, Manufacturing Optician, 49 Nassau St., N. Y.

Metallic letters and figures to put on foundry patterns all sizes. H. W. Knight, Seneca Falls, N. Y.

Hand and Power Bolt Cutters, Screw Plates, Taps in great variety. The Pratt & Whitney Co., Hartford, Ct. C. B. Rogers & Co., Norwich, Conn., Wood Working Machinery of every kind. See adv., page 63.

Trevor's Patent Key Seat Cntter. Trevor & Co., Lockport, N. Y. See page 60.

NEW BOOKS AND PUBLICATIONS.

ANATOMICAL TECHNOLOGY AS APPLIED TO THE DOMESTIC CAT. By Burt G. Wilder and Simon H. Gage. New York: A. S. Barnes & Co.

The authors have chosen the anatomy of the domestic cat as the basis for an introduction to human, veterinary, and comparative anatomy because of the convenient size of the animal, its small cost and ease of attainment, its physical characteristics, and its zoological position. They confine their attention mainly to special portions of the gross anatomy of the cat—particularly the brain and the abdominal viscera—for the reason that these parts best serve their purpose of teaching the methods of anatomical study, with so much of the fundamental facts of structure and function and anatomical terminology as will suffice to give the beginner a good start toward successful independent study, whether as working naturalist, medical practitioner, or veterinary surgeon. The work is thoroughly scientific in spirit and method, and has had the practical test of several years' use in the anatomical laboratory of Cornell University. The description of materials, operations, and modes of study are minute, clear, and practical, making the work usable and very helpful for students working alone, as well as for teaching technical anatomy in medical and veterinary schools.

CATALOGUE AND INDEX OF THE PUBLICATIONS OF THE SMITHSONIAN INSTITUTION—1846 TO 1882. By William J. Rhees. Washington: Smithsonian Institution.

Scientific students and teachers will not be slow to appreciate the value of this catalogue. It comprises not only a full descriptive list of the publications of the Institution (now nearly 500 in number), but also an alphabetical index (covering 200 octavo pages) of all the articles in the Smithsonian contributions, miscellaneous collections, annual reports, bulletins, and proceedings of the United States National Museum, and report of the Bureau of Ethnology. In addition, there is a convenient and valuable classified list (thirty pages) of separate publications of the Institution, arranged by subjects and authors.

A PRACTICAL TREATISE ON CAOUTCHOUC AND GUTTA-PERCHA. From the German of Raimund Hoffer, by William T. Brant. Philadelphia: Henry Carey Baird & Co. \$2.50.

An interesting account of the natural, industrial, and commercial history of these important gums; their sources, properties, and the manner of working them in the crude state; the fabrication of vulcanized and hard rubbers; caoutchouc and gutta-percha compositions; waterproof substances, elastic tissues, and other useful products. There are also chapters on the impurities and adulterations of the raw materials; the utilization of wastes in the various manufacturing processes; substitutes for gutta-percha and rubber, statistical data, etc. The work will be found an instructive and suggestive handbook for manufacturers, dealers, and inventors.

THE BUILDER'S GUIDE AND ESTIMATOR'S PRICE BOOK. By Fred. T. Hodgson. New York: Industrial Publication Company.

This handbook is intended chiefly to assist the builder and contractor in making estimates of the cost of work. It gives practical directions for making estimates; memoranda of items for estimates, and modes of calculating quantities and costs; schedules of approximate prices for materials and labor in each department of construction; rules for measuring artificers' work; elementary mechanics of architecture; weight and strength of various building materials; useful tables; glossary of technical terms; summary of lien laws of the various States, and other information of value as well to those who contemplate building as to those who are to do the work.

AN INTRODUCTION TO THE STUDY OF ORGANIC CHEMISTRY. By Adolph Pinner, Ph.D. From the Fifth German Edition, by Peter T. Austin, Ph.D., Rutgers College. New York: John Wiley & Sons.

An admirably straightforward and intelligible account of the structural development of the carbon compounds as found in nature or artificially produced in the chemist's laboratory. Professor A. W. Hofmann, of Berlin, whose class-room teaching the work substantially follows, had a genius for organizing chemical instruction; and in this text book the subject is developed with wonderful precision, coherence, and clearness. We do not know another text book in this usually bewildering science that can compare with it in usability or for giving in small compass a comprehensible general view of the science.

PICTURESQUE JOURNEYS IN AMERICA OF THE JUNIOR UNITED TOURISTS' CLUB. Edited by Rev. Edward T. Broomfield. New York: R. Worthington.

Under the guise of reports of papers and conversations of a young people's club of stay-at-home tourists, the editor has somewhat heavily supplied descriptive text for a considerable number of illustrations of American scenery. Many of the engravings are large and admirable wood cuts of views in California, Utah, the Yellowstone Park, the mountains of Pennsylvania, the Adirondacks, the White Hills, and along the Atlantic coast; a few are poor, and some have obviously been misplaced. Occasionally the editor betrays personal unfamiliarity with the regions described, and a lack of skill in developing the capabilities of his subject. But young folks are not so critical as their elders; the pictures are suggestive, if not always instructive; and the book as a whole is above the average of the class. It is well printed and handsomely bound.

GATELY'S UNIVERSAL EDUCATOR: AN EDUCATIONAL CYCLOPEDIA AND BUSINESS GUIDE. Edited by Chas. E. Beale and M. R. Gately. Boston: M. R. Gately. 8vo., 3 vols. in 1; pp. 361, 396, and 372.

The aim of this ambitious volume is to present under one cover the general principles and many of the practical applications of the educational and business sciences and the more general useful and ornamental arts. The first volume embraces vegetable and animal life, astronomy, geology, mineralogy, metallurgy, physical geography, human history, statistics, and law. Vol. ii.: Architecture, drawing, physics, and mechanics; chemistry, agriculture, physiology, medicine, hygiene, etc. Vol. iii.: Grammar, poetry, rhetoric, logic, elocution, phonography, penmanship, music, letter writing and bookkeeping, department, domestic economy, games, tailors' measures, milling, etc., etc. Fifteen contributors are named; none of them widely known as writers or teachers. Bearing in mind the fact that the most difficult thing in the world is to present the elements of any science or art in small compass, in plain and understandable English, with accuracy as to facts and sound judgment as regards the proportioning of parts, the value of this work will be indicated when we say that, with one or two exceptions, the contributors have shown anything but a comprehensive view and grasp of their subjects, and little skill in expressing what they have to say. In several instances the articles are the rawest sort of hack-work, by unskillful compilers who cannot write even tolerable English. In these days of cheap manuals by the most capable investigators and instructors, and of cheap encyclopedias as well, a work of this sort would have to be supremely good to succeed.

A DICTIONARY OF ELECTRICITY; OR, THE ELECTRICIAN'S HAND-BOOK OF REFERENCE. By Henry Greer, with additions by Wm. L. Allison. Published by New York Agent of College of Electrical Engineering. 12mo. \$2.00.

Contains definitions of a large number of terms used in electrical science, descriptions and illustrations of the more important recent forms of electrical appliances, and other kindred matter of value as well to the general reader as to those directly interested in the invention, manufacture, or use of electrical apparatus and machinery. The book might be more comprehensive, and should be better printed for the price.

HISTORY OF THE PACIFIC STATES OF NORTH AMERICA. By Hubert Howe Bancroft. Vol. i., Central America. San Francisco: A. L. Bancroft & Co., 1882. 8vo; pp. lxii-704.

Mr. Bancroft has developed a method of historical research and authorship as magnificent as the results are commendable. He pursues history as Mr. Edison does invention, with a corps of trained assistants and a "plant" embracing everything attainable in print or in manuscript bearing upon the subject in hand. For example, the authorities quoted in the present volume fill nearly fifty closely printed octavo pages, and number something like twenty thousand entries, not a few of the names standing for collections of fifty or sixty volumes and more. This vast store of raw material forms a part of the historical library which Mr. Bancroft has collected for his great undertaking. The "History of Central America" takes up the history of the Pacific States where it was dropped on the completion of the author's "Native Races of the Pacific Coast." The first volume covers the period between 1501 and 1530, introduced by a rapid and brilliant survey of the European world, particularly Spain, at the beginning of the sixteenth century, and a chapter on Columbus and his discoveries. The author's theory of history writing is to tell the truth plainly and concisely. His style is direct and forceful, sometimes eloquent; and the matter of this volume is of necessity a record of some of the most exciting, adventurous, courageous, horrible, and damnable undertakings and proceedings that human history has place for. The "History of Central America" is to be followed by other volumes devoted to Mexico, the North Mexican States, New Mexico and Arizona, California, Nevada, Utah, the Northwest Coast, Oregon, Washington, Idaho and Montana, British Columbia, and Alaska. It is to be hoped that Mr. Bancroft's health and endurance may be adequate for the completion of the monumental task which has been so admirably begun.

Notes & Queries

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.

Correspondents sending samples of minerals, etc., for examination, should be careful to distinctly mark or label their specimens so as to avoid error in their identification.

(1) **I. B. F.** writes: Can you give me any information relating to aniline colors, how made, etc.? Have you any information in any of your SUPPLEMENTS? A. Consult SCIENTIFIC AMERICAN SUPPLEMENTS, Nos. 57 and 68.

(2) **A. M.** asks: Can you give me formulae for making cotton, vegetable, and orange fertilizers? I have abundance of fish, salt marsh, muck, pine wood ashes, and charcoal. An orange fertilizer should have the following composition: ammonia, 3.25 per cent; available phosphoric acid, 3.50 per cent; potash, 14.50 per cent. Cotton fertilizer: ammonia, 250 per cent; available phosphoric acid, 7.50 per cent; potash, 4 per cent. The formula for the vegetable fertilizer varies with the kind of vegetable which is cultivated: Ammonia, 5 to 7 per cent; available phosphoric acid, 6 per cent; potash, 8 to 12 per cent. It will be necessary for our correspondent to have analyses made of his refuse materials, and then from the analytical data obtained calculate them to the above formulae.

(3) **N. T. R.** asks: Which is best to use, iron or steel rivets in riveting two steel plates together? The plates are one-sixteenth inch thick, and the pressure is between the plates—that is, to spread them apart. A. Steel rivets are best, if they are sufficiently soft.

(4) **H. L. S.** writes: 1. We have a steam boiler, 42 inches by 12 feet, with thirty-four 3 inch flues. It furnishes steam to run a 10 inch by 15 inch engine, and concentrate the cane juice. We find it is too small to run our machinery to its full capacity during the sorghum season (about two months); the balance of the year we wish to run a feed mill to the capacity of the engine. Will it be the most economical in setting up, fixtures, and consumption of fuel, etc., to get another boiler of same size to build in with the one we have, or sell ours (for almost cost) and get one larger—50 inches by 14 feet, with fifty-two 3 inch flues? A. Sell and get a larger boiler. 2. Will it be better (in our business) to superheat the steam by running the flue back over the whole length of boiler before entering the chimney? A. No; there will be danger of injuring the top of boiler.

(5) **W. O.** asks: 1. Has aluminum the appearance of silver? I am informed it has, and will not tarnish as silver does. If so, can it be used as an alloy with gold? A. For a complete description and history of the metal aluminum we refer you to SCIENTIFIC AMERICAN SUPPLEMENT, No. 36. 2. Some students of the English language have disputed about the number of the letters of the alphabet, and their sound. Would it be possible to construct an instrument of the character of the telephone or phonograph that would analyze the sounds of the words, so as to get a correct alphabet? I was thinking of trying to construct such an instrument. I thought, as there were seven notes to music and seven primary colors in nature, we might find seven true vowels in language, and by getting the number of vibrations produced by the same per second, and dividing, might find the consonant filling the place in language, as the half note does in music. A. There are twenty-six letters in the English language, and, according to Corell, forty-one sounds, or according to Greene, forty. In order to ascertain about instruments used to analyze sound, it would be necessary to consult the literature of the subject. Both Helmholtz, of Berlin, and Koenig, of Paris, have described such instruments, but whether they will answer your purpose can only be decided by yourself. There are seven primary colors and seven notes in music.

(6) **J. T. F.** asks: 1. For the best way to polish fancy woods? A. Soft woods may be turned so smooth as to require no other polishing than that produced by holding it against a few fine turnings or shavings of the same wood while revolving. Mahogany, walnut, and some other woods may be polished by the use of a mixture as follows: Dissolve by heat so much beeswax in spirits of turpentine that the mixture, when cold, shall be of about the thickness of honey. This may be applied to furniture or to work running in the lathe by means of a piece of clean cloth, and as much as possible should be rubbed off by using a clean flannel or other cloth. Hard woods may be readily turned very smooth; fine glass paper will suffice to give them a very perfect surface; a little linseed oil may then be rubbed on, and a portion of the turnings of the wood to be polished may then be held against the article, while it turns rapidly around, which will in general give it a fine gloss. You may also try alcoholic shellac varnish, 2 parts; boiled linseed oil, 1 part; shake well before using. Apply a small quantity with a cloth, and rub vigorously until the polish is secured. 2. To make paper-hanger's paste? A. First heat water to boiling, then add flour with constant stirring. To prevent the formation of lumps the flour may be passed through a sieve, so as to insure its more equable distribution; agitation is continued until the heat has rendered the mass of the desired consistency, and, after a few moments' further boiling, it is ready for use. In order to increase its strength, powdered resin in the proportion of one sixth to one-fourth of the weight of the flour is added. To prevent its souring, oil of cloves, or few drops of carbolic acid is added.

(7) **J. H. S.** asks: Can I get as much power from an engine with a 3 foot flywheel and a 2 foot belt wheel, crank in center, by running belt direct from flywheel to mill as to run belt from pulley to line shaft and then to mill? The small pulley does not run the mill fast enough for direct connection. A. You can get as much power, if the engine runs at same speed, but the motion will not be so steady when belting from the flywheel as when belting from the pulley.

(8) **R. R. L.** writes: Some time last year you published, under the head of "Metallic Designs on Glass Reproduced by the Aid of Photography," a process for the same, and you mention as the principal article to be used "sensitive bitumen." What is it, and how is it sensitized? A. Sensitive bitumen is Assyrian asphalt dissolved in turpentine, ether, or oil of lavender. It is sensitive to light, and after exposure the parts which are not attacked by light may be dissolved out by oil of turpentine.

(9) **G. H. T.** asks how to soften putty that has become hard by exposure, so as to easily remove it from a sash. A. To soften putty, take 1 pound of pearl ash, 3 pounds of quick stone lime; slake the lime in water, then add the pearl ash, and make the whole about the consistency of paint. Apply it to both sides of the glass and let it remain for twelve hours, when the putty will be so softened that the glass may be taken out of the frame with the greatest facility.