

Business and Personal.

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Marine Iron Works. Chicago. Catalogue free. For logging engines. J. S. Mundy, Newark, N. J. "U. S." Metal Polish. Indianapolis. Samples free. Gasoline Brazing Forge, Turner Brass Works, Chicago. Yankee Notions. Waterbury Button Co., Waterbury, Ct. Handle & Spoke Mch. Ober Lathe Co., Chagrin Falls, O. Machine Work of every description. Jobbing and repairing. The Garvin Machine Co., 141 Varick St., N. Y. FERRACUTE Machine Co., Bridgeton, N. J. Full line of Presses, Dies and other Sheet Metal Machinery. Easy Experiments of Organic Chemistry. Book by Prof. Appleton. 60 cents. Suow & Farnham, Providence, R. I. R. Brent Mitchell, President of the Thackeray Incinerating and Fertilizing Company, is at the Hotel Empire, Cor. 63d St. and Columbus Avenue, N. Y. Hub, spoke, wheel, bending, and handle machinery. Single machines or full equipments, by the Defiance Machine Works, Defiance, Ohio, U. S. A. The celebrated "Hornsby-Akroyd" Patent Safety Oil Engine is built by the De La Vergne Refrigerating Machine Company. Foot of East 138th Street, New York. The best book for electricians and beginners in electricity is "Experimental Science," by Geo. M. Hopkins. By mail, \$4. Munn & Co., publishers, 361 Broadway, N. Y. Engineers and Firemen—Send 10c for a 24 page pamphlet, containing a list of questions asked by an examining board of engineers. Address Geo. A. Zeller, Bookseller, St. Louis, Mo. Send for new and complete catalogue of Scientific and other Books for sale by Munn & Co., 361 Broadway New York. Free on application.



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 This is for our information and not for publication.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.

(7517) R. H. L. asks: Would you kindly inform me as to the resistance of a mile of No. 10 German silver wire, one mile of No. 10 galvanized iron wire and the weight of one cubic foot of German silver? A. The specific resistance of copper is 1.6, of annealed iron 969, and of German silver 2089. The resistance of one mile of No. 10 A. W. G. hard-drawn pure copper wire is 5.28 ohms. The resistance of an iron wire of same gauge is found by dividing 5.28 by 1.6 and multiplying the result by 969, which gives 32 ohms nearly. Similarly, the resistance of the German silver wire is found to be 68.94 ohms. The density of German silver varies with its composition, from 8.30 to 8.77, and the weight of a cubic foot varies correspondingly, from 518 pounds to 547 pounds. See Gray's "Physical Tables," Smithsonian Institution's Collections, No. 1038. Tables 264, 65, and 96.

(7518) W. B. asks: What are the carrying capacities of Nos. 24, 22, 20 copper wire? A. These fine wires, judged by the Fire Underwriters' Rules, have no carrying capacities, since their use is forbidden. Still, carrying capacities may be calculated for them upon the same basis as for other wires. The general assumption is that a wire should not be heated by its current above 140° Fah. This will limit the amount of current a wire can carry in different situations. In a heated place it cannot carry so much as in a cool place, in moulding less than in open works, in close coils less than in open ones, with deep winding less than with shallow winding on a spool. It is found that from 1,000 to 4,000 amperes per square inch of cross section are practical limits of carrying capacity. To find allowable current for any wire, multiply its area of cross section by the number of amperes per square inch. At 1,000 amperes per square inch the carrying capacity would be: No. 24, 0.32 ampere; No. 22, 0.64 ampere; No. 20, 0.96 ampere; No. 18, 1.28 ampere. For other rates per square inch the carrying capacity would be in the same proportion.

(7519) H. S. asks: 1. How long does it take to produce a vacuum or a high state of rarefaction in a common 16 candle power incandescent light globe by a Bunsen pump that is connected to faucet of city water supply? A. A high vacuum cannot be produced with a Bunsen pump in this way. The space will always contain water vapor. 2. Can you give me the number of cubic inches rarefied in a certain length of time by above mentioned pump? A. The rate of exhaustion depends upon the size of the pump as compared with the space to be exhausted. Bunsen and Sprengel pumps are, of necessity, of small bore, and therefore slow in action. We doubt if any figure for amount of air removed can be given which would be reliable. 3. What is the best way to make a hole of certain size, say half an inch, in a large glass bottle without receiving fractures? A. To drill a hole in a glass bottle use the broken point of a file, wetting it with a solution made by dissolving camphor in turpentine. Have care not to bear too hard when the drill is nearly through. Enlarge the hole to required size with a round file wet with the same solution.

(7520) L. A. W. asks: Will you please advise through the columns of your valuable paper a formula for a flour paste, one that will keep indefinitely,

or at least for a long time? A. Water, 1 quart; alum, 3/4 ounce. Dissolve, and when cold, add flour to make it of the consistence of cream, then bring it to a boil, stirring it all the while. Paste may be preserved with aid of oil of cloves, ten drops to the pound, or an equal amount of carbolic acid.

(7521) H. A. H. writes: Have six cells dry battery which have never been used, but have stood idle for some time. Can they be recharged at slight expense, and how? A. Dry cells should not lose their activity by standing idle. They can only do so by corrosion of the metallic parts or by the drying of the paste in them. You can see if there has been corrosion. If the paste is dry, you can bore a hole through the top and put some water into the cell. After it has soaked a day or two, pour the remaining water out again and stop up the hole with any convenient stopper.

NEW BOOKS, ETC.

REMINISCENCES OF NEAL DOW. Recollections of Eighty Years. Portland, Me.: Evening Press Publishing Company. 1898. Pp. 769. 8vo. Plates. Price \$2.50.

The autobiography of a public character like Neal Dow is always attractive. Some of his early reminiscences are particularly interesting. He attended an academy, and he goes on to say, "One attraction to me was a large philosophical apparatus, which was said to be of the best construction and workmanship of its time. Through it I acquired a taste for mechanics in all branches. As one result of this I may here add that I have been a subscriber to the SCIENTIFIC AMERICAN from its first publication, I think, to the present time, and have never failed to carefully read each number when I have been at home with opportunity so to do." This is certainly a handsome compliment to the SCIENTIFIC AMERICAN, coming as it does from so high a source.

ACQUA, ELETTRICITA, TRAZIONE. Questioni ferroviarie urgenti. Naples: Tipografia Pontieri e Velardi. 1898. Pp. 117.

PAINTING TO PREVENT CORROSION. With Specifications. By A. H. Sabin, M.S. New York: Edward Smith & Company. 1898.

This is a very handsome little booklet filled with excellent engravings showing corroded metal surfaces and different structures which have been treated with durable metal coatings. The book is handsomely printed, and, while in the nature of a trade publication, it is filled with valuable information.

COMMERCIAL ORGANIC ANALYSIS. A Treatise on the Properties, Proximate Analytical Examination and Modes of Assaying the Various Organic Chemicals and Products employed in the Arts, Manufactures, Medicine. With Concise Methods for the Detection and Determination of their Impurities, Adulterations, and Products of Decomposition. By Alfred H. Allen. Second edition revised and enlarged. Vol. IV. Proteids and Albuminous Principles, Proteoids or Albuminoids. Philadelphia: P. Blakiston's Son & Company. 1898. Pp. 584. Price \$4.50.

A few weeks ago it was our privilege to review the first volume of this important work, and we now congratulate the publishers on the second revised and enlarged edition of Volume IV., which takes up proteids and albuminous principles and proteoids or albuminoids. Among the subjects treated are eggs, milk, meat and meat products and proteids of digestion, composition of the blood, gelatine, glue, dyeing, the hair, wool, etc. Those who consider that a thoroughly scientific chemical work must be dull and uninteresting will have their minds disabused of this idea by perusing the volume before us. It is filled with information which is of value to every food manufacturer, to the doctor, and to every chemist.

HAND BOOK OF CORLISS STEAM ENGINES. Describing in a Comprehensive Manner the Erection of Engines, the Adjustment of the Corliss Valve Gear, and the Care and Management of Corliss Steam Engines. By F. W. Shillito, Jr. Bridgeport, Conn.: The American Industrial Publishing Company. 1898. Pp. 224. Price \$1.

The demand for an elementary treatise on the Corliss engine has induced the author to undertake the preparation of this volume. Various types of Corliss engines are taken up in order, and information is given regarding their erection and adjustment. The book is well illustrated, but the illustrations do not show up as well as they might, as the paper has an unfortunate bluish tinge.

SHEWEY'S OFFICIAL HANDY REFERENCE POCKET ATLAS AND CYCLOPKEDIA. Chicago: A. C. Shewey. 1898. Pp. 94. Price 25 cents.

THE UNIVERSALIST REGISTER. Giving Statistics of the Universalist Church and Other Denominational Information, etc., for 1898. Edited by Richard Eddy, D.D. Boston: Universalist Publishing House. 1898. Pp. 120. Price 20 cents.

DIFFERENTIAL AND INTEGRAL CALCULUS. For Technical Schools and Colleges. By P. A. Lambert, M.A. New York: The Macmillan Company, Limited. 1898. Pp. 245. Price \$1.50.

The object of this text book is three-fold: by a logical presentation of principles to inspire confidence in the methods of infinitesimal analysis, by numerous problems to aid in acquiring facility in applying these methods,

and by applications to problems in physics and engineering and other branches of mathematics, to show the practical value of the calculus. This text book is intended for students who have a working knowledge of elementary geometry, algebra, trigonometry, and analytical geometry.

MODEL HOUSES FOR LITTLE MONEY. By W. L. Price. New York: Doubleday & McClure Company. Philadelphia: Curtis Publishing Company. 1898. Pp. 193. 18mo. Illustrated. Price 50 cents.

The present volume is made up from articles which have appeared in the Ladies' Home Journal and it is designed to be of aid in the building of small homes, the designing of which is too frequently left to the builders or others who are ignorant of architecture. The plans are on rather a small scale and the subject cannot be adequately treated in a book of such small dimensions, and on this account it is hardly as successful as "Inside of a Hundred Homes," which we also review. The section relating to the remodeling of doors and windows is the most interesting in the volume.

INSIDE A HUNDRED HOMES. By W. M. Johnson. New York: Doubleday & McClure Company. Philadelphia: Curtis Publishing Company. 1898. Pp. 140. 18mo. Price 50 cents.

The little volume before us contains photographic glimpses into a hundred of the most tasteful homes in America, where taste has gone further than money. The illustrations give hundreds of new ideas furnished by these actually existing rooms, which have not the cold formality of rooms shown by the large decorators and furniture dealers. It shows the extraordinary progress of modern book making when such a beautiful little volume can be produced at such a moderate cost.

The "Drama of Glass," by Kate Field, published by the Libbey Glass Company, of Toledo, Ohio, is one of the handsomest little trade publications which we have ever seen. The little half tones are exquisite examples of the photo-engraver's art. It will be remembered that the Libbey Glass Company had one of the most remarkable exhibits at the World's Fair, and there is no doubt that this exhibit of artistic cut glass has done much to popularize cut glass in the last few years, as many persons were able to see for the first time what cut glass really is and how it is made.

TO INVENTORS.

An experience of fifty years, and the preparation of more than one hundred thousand applications for patents at home and abroad, enable us to understand the laws and practice on both continents, and to possess unequalled facilities for procuring patents everywhere. A synopsis of the patent laws of the United States and all foreign countries may be had on application, and persons contemplating the securing of patents, either at home or abroad, are invited to write to this office for prices, which are low, in accordance with the times and our extensive facilities for conducting the business. Address MUNN & CO., office SCIENTIFIC AMERICAN, 361 Broadway, New York.

INDEX OF INVENTIONS

For which Letters Patent of the United States were Granted

NOVEMBER 8, 1898,

AND EACH BEARING THAT DATE.

[See note at end of list about copies of these patents.]

Table listing various inventions with their corresponding patent numbers, such as Acid receiver and pressure regulating mechanism, Advertising device, Air compressor governor, etc.

Table listing various inventions with their corresponding patent numbers, such as Car coupling, Car guard, Car life saving apparatus, Car wheels, etc.

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