

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 the following week's issue.

Marine Iron Works. Chicago. Catalogue free.
 U. S. Metal Polish. Indianapolis. Samples free.
 Casoline Brazing Forge, Turner Brass Works, Chicago.
 Yankee Notions. Waterbury Button Co., Waterbury, Ct.
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 Machinery designed and constructed. Gear cutting. The Garvin Machine Co., Spring and Varick Sts., N. Y.
 Order White Metal & Brass Pattern Letters & Figures of H. W. Knight & Son, Seneca Falls, N. Y. Drawer 1115.
 The celebrated "Hornsbly-Akroyd" Patent Safety Oil Engine is built by the De La Vergne Refrigerating Machine Company. Fort 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.
 Send for new and complete catalogue of Scientific and other Books for sale by Munn & Co., 361 Broadway, New York. Free on application.

Notes & 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 This is for our information and not for publication.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.

(7649) P. H. W. asks: 1. What causes the report when a cannon is fired? A. The liberation of the powder gases at the muzzle of the gun. 2. Does the report obtain at the moment the projectile leaves the muzzle of gun? A. Yes. 3. Does the recoil take place before the ball is half way out of the gun? A. Recoil commences at the instant when the projectile begins to move down the bore. 4. Does the force of the powder gas exert itself up to the moment the shot leaves the muzzle? A. Yes. 5. Does the air in front of the projectile, when the gun is fired, offer much resistance to projectile when same is near the muzzle of gun? A. The air is expelled from the bore by the projectile and offers resistance during the whole travel of the projectile through the bore.

(7650) T. C. writes: In answer to query No. 7618, March 25, "Is it possible for a man to know the direction in which he is going if he were inclosed in a box with nothing except a compass?" I understand H. J. D. to mean the box to move carrying the occupant with it. If the box were placed on a car, with the occupant not knowing to which end the locomotive was attached, he could not tell in which direction he was moving, even with the aid of a compass. The compass tells or shows you the name of the direction you are moving. You must know the direction by observation. A. Query 7618 was answered with the understanding that the correspondent wished to know if a compass needle would indicate direction when inclosed in a box. This seemed to us to be the only reason for referring to the compass at all. Several other correspondents have written us, suggesting that the meaning of the question is, Can a man tell in what direction he is being carried, if he cannot see? This question requires no compass. To this question we answer, we do not know any general answer. We think some men can. We are sure others cannot.

(7651) J. B. A. writes: Please state fully through your interesting paper how scientific men determine the sun's distance. When and where were the last measurements taken? Is 92,800,000 miles the average distance, or the distance when the earth is nearest the sun? Is the above distance correct? A. One of the earlier methods for finding the solar parallax that were in any way reliable was that of Halley, by transits of Venus. From observations of the transits of Venus in 1761 and 1769 Laplace and Delambre computed the parallax or angle of the earth's diameter as seen from the sun to be 86'' to 88'', making by triangulation a distance of 95,000,000 and 92,890,000 miles. Hansen, by his researches upon the motion of the moon in 1854, corrected Enckes' computation made in 1824, making the sun's distance 91,852,000 miles. The latest discussion by Newcomb from all the previous observations, including the velocity of light as observed by Michelson, has established the solar parallax at 8.85'', which has been adopted and used in the computations for the Nautical Almanacs. It is based on Clarke's value of the earth's radius of 3960 miles, making the sun's distance 92,372,000 miles. The Paris Astronomical Conference, in 1896, adopted 8.8'' as the value of the solar parallax, and after the year 1900 this is to be used by all nations for their nautical almanac computations. It makes the sun's mean distance 92,897,000 miles. A description of the various methods that have been used for determining the parallax, which is a most interesting one, giving diagrams and formulas that we cannot produce in Notes and Queries, is contained in a chapter in Young's "General Astronomy," which we can furnish mailed at \$3.

NEW BOOKS ETC.

THE PURIFICATION OF SEWAGE. A Brief Account of the Scientific Principles of Sewage Purification and their Practical Application. By Sidney Barwise, M.D. New York: D. Van Nostrand Company. 1899. Pp. i-xii, 150. Price \$2.

The present volume is a small book upon a large subject, but there is no objection to this when a book is of a high technical quality like the volume before us. The chemistry of sewage, the varieties of sewage, and the changes it undergoes, as well as river pollution, rain treatment, precipitation, filtration, are all adequately treated in addition to the new departure, "bacteriology."

ELECTRICITY IN TOWN AND COUNTRY HOUSES. By Percy E. Scrutton. Second Edition. Westminster, London: Archibald Constable & Company. 1898. Pp. 148. Price \$1.

This little book will doubtless prove valuable to those who wish to get some general information about the subject, and who do not care to go very deeply into it. The book does not call for special mention.

THE DAWN OF REASON; OR, MENTAL TRAITS IN THE LOWER ANIMALS. By James Weir, Jr., M.D. New York: The Macmillan Company. London: Macmillan & Company, Limited. 1899. Pp. 234. Price \$1.25.

Dr. Weir is already known to the readers of the SCIENTIFIC AMERICAN by reason of his numerous articles of high scientific value. In "The Dawn of Reason" he deals with such subjects as "The Senses in the Lower Animals," "Conscious Determination," "Memory," "The Emotions," "Aestheticism," "Parental Affection," "Reason," and others. It is a rather difficult book to classify, but it is a very readable one, and is worthy of attention by all who are interested in any way in natural history or psychology, and shows that the author is an original thinker.

STEAM BOILER PRACTICE. In its Relation to Fuels and their Combustion and the Economic Results Obtained with Various Methods and Devices. By Walter B. Snow, S.B. First Edition, First Thousand. New York: John Wiley & Sons. London: Chapman & Hall, Limited. 1899. Pp. 297. Price \$3.

There always seems to be room for a new book on steam boilers. Hardly a month goes by without one coming to the editor's table. The book before us treats of the subject in a somewhat different manner to books which have preceded it. It deals particularly with the results obtained, rather than with a detailed description of the methods and devices employed to secure the economical combustion of fuel in connection with a steam boiler. The appears to be ample room for a work which, while simple in its treatment, shall deal primarily with effect rather than with causes, and which shall undertake to indicate the possible gain or loss to result from a given arrangement and shall point toward the highest efficiency in steam boiler practice. The author has performed his task in a very creditable manner.

HARDWARE STORE BUSINESS METHODS. Compiled and Edited by R. R. Williams, Hardware Editor of The Iron Age. New York: David Williams Company. 1899. Pp. 200. Price \$1.

Business nowadays has been brought to such a fine point that the merchant has actually to be taught methods of business, and no up-to-date merchant will hesitate about accepting methods which will tend to decrease his expenses or render his accounts more accurate. It would be gratifying if every kind of business should have a manual such as is now offered to those in the hardware trade. It is a book which can be confidently commended.

ENGINEERS' HANDY BOOK. Containing Facts, Formulas, Tables, and Questions on Power, its Generation, Transmission, Measurements, etc. By Stephen Roper. Revised and greatly enlarged by Edwin R. Keller and Clayton W. Pike. Philadelphia: David McKay. 1899. 16mo. Pp. 844. Profusely illustrated. Pocketbook style, full leather, gilt edges. Price \$3.50.

The great value of Roper's well known pocketbook is evidenced by its being in its fifteenth edition. We have yet to learn that any poor book has reached anything like this sale. It is filled with the most valuable information, giving exactly what the engineer, and, specially, the young engineer wishes to know. Mathematics are avoided as far as possible, and all of the problems in the book can be solved with the aid of arithmetic. The book is thoroughly practical, and, for this reason, it appeals to all practical men. There are a large number of questions annexed which will prove of great value to young men who are anxious to obtain engineers' licenses. The boiler, the steam engine, the steam engine indicator, gas and gasoline engines, materials, their properties and strength, are all considered. There is a discussion of experiments in electricity and an explanation of the dynamo, motor, batteries, switchboard, telephones, bells, annunciators, alarms, etc. The book is got out in very handsome form and can be carried in the pocket. It is a most admirable book.

THE A B C UNIVERSAL COMMERCIAL ELECTRIC TELEGRAPHIC CODE. Specially adapted for the use of Financiers, Merchants, Shipowners, Brokers, Agents, etc. By W. Clauson-Thue. New York: The American Code Publishing Company, 83 Nassau Street. 1899. 8vo. Pp. 480. Price \$5.

A telegraphic code is absolutely indispensable in commercial transactions where the telegraph or cable is utilized, and there are a vast number of systems in use. The A B C code has an enviable reputation for being one

of the most usable, and it certainly appears to be the most flexible. The present edition contains nearly 25,000 sentences, including names for products, rates, numbers, quantities, and a large number of special words which may be used by the owner of the volume for special purposes. The selection and arrangement is most admirable.

METEOROLOGICAL OBSERVATIONS. Made at the Adelaide Observatory and Other Places in South Australia and the Northern Territory during the Year 1895. Under the Direction of Charles Todd. Published by authority of the Government of South Australia. Adelaide: Printed by C. E. Bristow, Government Printer, North Terrace. 1898. Pp. 75.

THE HISTORY OF MANKIND. By Prof. Friedrich Ratzel. Translated from the Second German Edition by A. J. Butler. With Introduction by E. B. Tylor. With colored plates, maps, and illustrations. Vol. III. London: Macmillan & Company, Limited. New York: The Macmillan Company. 1898. Pp. 599. Price \$4.

Prof. Ratzel is known to be one of the greatest ethnologists in the world, and his book shows a wonderful advance over its predecessors, such as Pritchard, Smith, Wood, etc. The present volume (III.) deals with the negro races in the interior of Africa and the west of Africa. Then the cultured races of the Old World are taken up, including the races of Africa and Asia, and finally the Europeans. The publishers have brought out the volume in a most sumptuous form. It is profusely illustrated, and there are eleven colored plates and several maps. The quality of the illustrations deserves particular mention, for too often in books of this kind the question of illustration is disregarded, owing to the great expense, and it is satisfactory to see the life work of a great authority properly clothed. The book can be most warmly commended to all who are in any way interested in ethnology, and we regard it as one of the most remarkable contributions which have been made to the subject. We hope to give an illustrated review of this great book in our SUPPLEMENT at some future time.

A TREATISE ON PHOTOGRAPHIC OPTICS. By R. S. Cole, M.A. New York: D. Van Nostrand Company. 1899. 12mo. Pp. 330. Price \$2.50.

A new work on this subject has been needed for some time, and the author has admirably acquitted himself of a difficult task. The object of the treatise is to provide an account of the principles of optics in so far as they apply to photography. The error of making it too abstruse, which would place it out of the reach of all but professional mathematicians or physicists, has been avoided. To make the mathematics as intelligible as possible, most of the results have been illustrated by worked numerical examples.

LATEST SCIENCE. J. E. Harvey, Moscow, Idaho. Price 10 cents.

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INDEX OF INVENTIONS

For which Letters Patent of the United States were Issued for the Week Ending

APRIL 18, 1899,

AND EACH BEARING THAT DATE.

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

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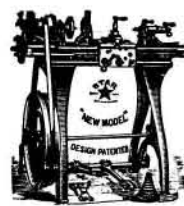
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Advertisements.

ORDINARY RATES.

Inside Page, each insertion, - 75 cents a line
 Back Page, each insertion, - \$1.00 a line
 For some classes of Advertisements, Special and Higher rates are required.

The above are charges per agate line—about eight words per line. This notice shows the width of the line, and is set in agate type. Engravings may be advertised at the same rate per agate line, by measurement, as the letter press. Advertisements must be received at Publication Office as early as Thursday morning to appear in the following week's issue.



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