

placed vertically above the sliding plate. Supposing each hopper to be alike, and filled with the same amount of the same grade of sand, what will be the proportion in the rate of flow from the two hoppers? In other words, will the two hoppers be emptied in the same length of time, or in the inverse ratio of the diameter of the eccentrics? I trust that I am not imposing too much upon your kindness, and thank you beforehand. A. As the slots in the sliding plates coincide with those at the bottom of the hopper at the end of the stroke of the former, the time during which the sliding slot coincides with the fixed one will be practically the same for both slots in spite of the difference of diameter of the eccentrics. Were the points at which the slots register in the middle of the strokes of the sliding plate, the plate operated by the 8-inch eccentric would be traveling twice as fast as that of the 4-inch, and the slot would therefore be open half the time and half the quantity of sand would be discharged; but as the speed of the sliding plate is variable, due to the conversion of rotary to sliding motion, and both plates must come to rest at each end of their strokes, the period during which each is at rest will not be measurably different. It is probable that in a long continuous run a little more sand would be found discharged through the plate operated by the 4-inch than by the 8-inch eccentric, but the quantities discharged would not differ by an amount approaching the inverse ratio of the strokes.

NEW BOOKS, ETC.

RUGS ORIENTAL AND OCCIDENTAL, ANTIQUE AND MODERN. A Hand Book for Ready Reference. By Rosa Belle Holt. Chicago: A. C. McClurg & Co., 1908. Quarto; 202 pp. Price, \$5.

Since the first edition of this book was published, circumstances connected with the buying and selling of Oriental rugs have changed, and the number of reliable authorities has increased considerably. The illustrations are of the highest possible order. They are some of the finest examples of color printing which have been brought out in years. The frontispiece is a magnificent reproduction of a beautiful antique Tabriz silk rug. The other plates are equally fine, and will be a great treat to all lovers of rugs. The work begins with the history and details of rug weaving, then the subject of rug weaving in Egypt, Persia, and Turkey is taken up, followed by a description of rug weaving as conducted in India, Afghanistan, Beluchistan, Central Asia, and the Caucasus region. Then miscellaneous Oriental rugs are treated, such as rugs of the Holy Land, Chinese rugs, Japanese rugs, Polish rugs, silk rugs, felt rugs, prayer rugs, hunting rugs. Rug weaving in Europe and the United States is treated separately, the European countries being Greece, Morocco, Spain, Bosnia, Servia, Roumania, Bulgaria, England, and France. The last chapter, giving miscellaneous information, takes up the question of inscriptions on rugs, Oriental symbols, Chinese symbols, Japanese symbols, Persian symbols, Turkish symbols, miscellaneous symbols, and the meanings of some of the place names associated with rugs. There is also some valuable geographical data and an excellent list of authorities.

THE OCEAN CARRIER. By J. Russell Smith, Ph.D. New York: G. P. Putnam's Sons, 1908. 12mo.; 344 pp. Price, \$1.50 net.

At last we have a history and analysis of ocean transportation with a discussion of its rates. This book fills a very much neglected niche in the history of transportation. It is the outgrowth of the study of three questions: The development of line traffic; the combination among carriers to control rates, and the combination of steamship lines and railways. Numerous writers have dealt with the activities of the ocean, which is a fascinating subject. Biographies of men and of ships, technical details of ships, appear to have been the interesting things. Who built the ship; just when; just where; how long she was to an inch; how wide; how deep; the material; the tonnage; the exact size of her engines; the number of strokes per minute, her speed; her best voyage-record; who captained her, etc. Such information can be collected by the volume, but there is an astonishing silence in the pages of the past as to what these wonderful ships actually did and how much they paid; what they carried; where they carried it; for whom; under what method of management, are things rarely, if ever, told by writers of maritime topics. Such records do, however, exist, as incidental statements in a wide variety of documents, and the present work takes up this information in the most painstaking manner. From the immense mass of materials available, the author traces out the main lines of past development and detects the dominant factors in the present situation. The book is well illustrated by carefully chosen engravings of vessels, and by excellent maps dealing with the great trade routes and the activities of the great steamship companies.

THE WONDER BOOK OF MAGNETISM. By Edwin J. Houston, Ph.D. New York: Frederick A. Stokes Company, 1908. 12mo.; 325 pp. Price, \$1.50 net.

The purpose of "The Wonder Books of Science" is to bring home to the young reader the fascination of the marvels of nature, and to explain the wonderful laws which govern them.

The author is singularly happy in getting the point of view of the youthful reader. Having been, during his life, a practical scientist and a successful teacher of boys, he combines the most desirable forms of experience. In this book the author tells of magnetic batteries and magnetic currents; lodestones; magnets that remember and magnets that forget; the compass, the curious causes of its variations and the methods of preventing them; peculiarities of the earth's magnetism; the Auroral Lights; the telephonograph, or talking newspaper, and many other marvels.

GLASS MANUFACTURE. By Walter Rosenban, B.A., B.C.E. New York: Van Nostrand Company, 1908. 12mo.; 264 pp. Price, \$2 net.

The present volume on glass manufacturing has been written chiefly for the benefit of those who are users of glass, and therefore makes no claim to be an adequate guide or help to those engaged in glass manufacture itself. For this reason, the account of manufacturing processes has been kept as non-technical as possible; no appliances have been given, and only a few diagrams have been introduced for the purpose of avoiding lengthy verbal descriptions. There are few industries where the processes of manufacturing are kept more secret, so that the path of the author who would give an accurate account of the best modern processes used in any given department of the industry, is beset with great difficulties. The author has endeavored to steer the best course open to him under these circumstances, and he appeals to the paucity of glass literature in the English language as evidence of the difficulty to which he refers. The physical and mechanical properties of glass are first taken up, then the raw materials of glass manufacture are treated, which is followed by a chapter on crucibles and furnaces for the fusion of glass, the process of fusion, processes used in the working of glass, bottle glass, rolled or plate glass, sheet and crown glass, colored glasses, optical glass, and miscellaneous products.

THE DESIGN OF HIGHWAY BRIDGES AND THE CALCULATION OF STRESSES IN BRIDGE TRUSSES. By Milo S. Ketchum, C.E. New York: The Engineering News Publishing Company, 1908. 8vo.; 544 pp. Price, \$4.

The aim in writing this book has been to give a brief course in the calculation of the stresses in bridge trusses, followed by a systematic discussion of the details and the design of highway bridges. While there are many excellent books in which the different types of railway bridges are discussed in detail, little attention has heretofore been given to the design of highway bridges. As a consequence of this neglect, many of our highway bridges have been very badly designed, the design of these structures being ordinarily left to an engineer without experience or the agent of some bridge company who was more interested in the resulting profit than in obtaining a good design. The calculation of the stresses in highway and railway bridges is similar, but the problems in the design of the two types are very different, due to the different requirements and conditions. The problem of the design of a highway bridge includes the design of both the superstructure and the substructure. Most of the treatises on bridge design deal with the superstructure only, but in this book, due attention has been given to the design of both superstructure and substructure, and to the effect of the design of one on the other. The author discusses in detail the costs of the different parts of highway bridges. These costs are of value principally to the student and to the experienced engineer who is familiar with the conditions of the particular piece of work. The book is freely illustrated with drawings, diagrams, photo-engravings, and tables. It is an extremely valuable book for the engineer.

GENERAL LECTURES ON ELECTRICAL ENGINEERING. By Charles Proteus Steinmetz, A.M., Ph.D. Edited by Joseph Le Roy Hayden. Schenectady, N. Y.: Robson & Adee. 8vo.; pp. 284. Price, \$2.

The book contains a collection of seventeen lectures of a general nature, dealing with problems of generation, control, transmission, distribution, and utilization of electric energy. The work is largely descriptive and not mathematical. An appendix on light and illumination, and another on lightning and lightning protection, are also included in the volume.

SHOP TESTS ON ELECTRIC CAR EQUIPMENT. By Eugene C. Parham, M.E., and John C. Shedd, Ph.D. New York: McGraw Publishing Company. 12mo.; 55 illustrations; pp. 121. Price, \$1.

This is a small practical handbook adapted for the use of inspectors and foremen in the testing of electric car equipments. The tests are of such a character that they may be performed with the instruments and facilities available in a car house. In order to fix the rules and tests in the minds of the readers, many examples are given and a set of questions is provided at the end of the book.

MEMORIES OF MY LIFE. By Francis Galton, F.R.S. With eight illustrations. New York: E. P. Dutton & Co., 1909. Pp. 339. Octavo. Price, \$3.50.

Francis Galton is probably the hardest scientist to classify of our day, for the simple

reason that he was never a specialist for any great length of time, but has been what may be called a good "all-around" man of science. He has been an able statistician, a meteorologist, a "finger-print" classifier, a founder of anthropometrical and psychological laboratories, an explorer, a pedagogue, an authority on heredity, and the founder of "eugenics." These pleasantly written memoirs of his tell the story of his manifold activities in a simple, unaffected way, and give one many a rare glimpse of the great scientists who made the closing half of the nineteenth century one of the most remarkable periods in the history of the world. It is but natural that a man who has such strong notions on the subject of heredity should open his memoirs with a fairly exhaustive statement of his family stock.

Legal Notices

PATENTS

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INDEX OF INVENTIONS

For which Letters Patent of the United States were Issued for the Week Ending April 13, 1909, AND EACH BEARING THAT DATE [See note at end of list about copies of these patents.]

Table listing various inventions and their patent numbers, including items like Abdominal support and truss, Abrasive apparatus, Air compressor, Air brake, and many others.

Table listing various inventions and their patent numbers, including items like Cap, miner's, Car washable, Car construction, Car controlling mechanism, and many others.