

of this heater is oval in plan, and a transverse arch rises centrally in the tank from its bottom, extending between the front and rear walls.

DISPLAY STAND. — Jefferson D. Goddard, Kansas City, Mo. This stand comprises a base and vertical standard carrying at its top a pennant, while midway is an irregular, box-like figure with open sides and vertical partitions, the central portions of the top and bottom of the box-like figure being higher than the side portions.

TRIMMING. — Friedrich Hassenpflug, New York City. According to this design, loop-like wings extend at angles one to the other, in groups, radiating from a common center.

NOTE.—Copies of any of the above patents will be furnished by Munn & Co., for 25 cents each. Please send name of the patentee, title of invention, and date of this paper.

NEW BOOKS AND PUBLICATIONS.

THE METALLURGY OF IRON AND STEEL. By Thomas Turner, Associate of the Royal School of Mines. Vol. I. The Metallurgy of Iron. London: Charles Griffin & Company, Limited, Philadelphia: J. B. Lippincott Company, 1895. Pp. 367. 8vo. 80 illustrations. Price \$5.

This is a volume of Griffin's Metallurgical Series, which is edited by Professor W. C. Roberts-Austen, C.B., F.R.S. The present work is one of a series of treatises on metallurgy written by associates of the Royal School of Mines. The history of the manufacture of iron and steel is treated more fully than is usual in metallurgical treatises, as is also the section dealing with foundry practice and with the reactions of the puddling furnace. The author has paid particular attention to these branches of the subject. A special chapter has been devoted to the corrosion of iron and steel, as this is a subject of great importance in connection with the permanence of modern structures. The special bibliographies are of great value, giving references not only to books, but to periodical literature as well. The work abounds with tables and other data, some of it heretofore unpublished, which cannot but prove of value to all who are engaged in manufacturing iron, and to the student of metallurgy as well.

TEXT BOOK OF THE PRINCIPLES OF PHYSICS. By Alfred Daniell, M.A., LL.B., etc. New York and London: Macmillan & Company, 1895. Pp. 782. 8vo. 257 illustrations. Price \$4.

This is the third edition of Daniell's Physics, a work which, since the publication of the first edition in 1884, has achieved a most enviable reputation. The work is a recognized standard wherever the English language is understood. It is withal one of the most readable works on physics among those not intended for popular use. The plan of the work is that of a gradual progression from the simpler to the more complex subjects. No preliminary knowledge of principles is assumed, and every effort is made to attain lucidity of expression. The aim of the author has not been to build up a mere compendium of physical facts, but rather to put the reader in possession of such principles as will enable him with small difficulty to apprehend and appreciate these facts. The present edition includes the sixth thousand, which speaks very well for a scientific book which does not appeal to a popular reader. The arrangement is admirable, and many of the facts printed in small type are of the greatest value. An excellent bibliography is provided.

IRRIGATION FARMING: A HANDBOOK FOR THE PRACTICAL APPLICATION OF WATER IN THE PRODUCTION OF CROPS. By Lute Wilcox. New York: Orange Judd Company, 1895. Pp. 312. 12mo. 95 illustrations. Price \$2.

Irrigation has become an important factor in modern agricultural pursuits, and it is becoming more or less essential in all parts of the country, so that the need of more specific knowledge regarding it has led the author to write the present book. By means of this work any one can set about constructing an irrigating plant of any given capacity and can proceed to irrigate his land intelligently and correctly. The book is primarily written for and adapted to the use of our Western farmers, but it will prove equally valuable to the farmers of the South and other sections of the country. The text is clear and concise and cannot but be of value to the farmer. The concluding portions of the book give an admirable review of the common law of irrigation and a glossary of irrigation terms.

A GUIDE TO SYSTEMATIC READINGS IN THE ENCYCLOPEDIA BRITANNICA. By James Baldwin, Ph.D. Chicago and New York: The Werner Company, 1895. Pp. 316. 8vo. Price \$2.

Although the Britannica has long been recognized as one of the greatest of reference books, and although its possessors may never have consulted it without complete satisfaction, its full value has seldom been recognized. It is usually regarded simply as a repository of general information to be kept at hand for consultation as occasion may demand. While this is the ordinary use of the Britannica, it may be utilized in such manner as to perform the office of a great educational agent. The present work shows how this may be done. The plan has been to direct each individual how to draw from this great storehouse of knowledge that which will cover with all desirable completeness the line of work in which he is most interested. This is done by an elaborate series of references which have been arranged according to the subject. The work is an admirable one and is worthy of great success.

PRIMER OF PHILOSOPHY. By Dr. Paul Carus. Chicago: The Open Court Publishing Company, 1895. Pp. 232. 12mo. Price 25 cents.

It is not expressly designed to give instructions to beginners in philosophy, but it is nevertheless available for that purpose. The uninitiated student will not be bewil-

dered or mystified, in perusing its pages, by unintelligible phrases. The subject is presented with great simplicity, so that the leading idea may be gathered by a glance at its contents. The most essential technical terms are explained, and the high practical importance of philosophy is never lost sight of. The point of view adopted by the author is new to the extent that it cannot be classified among the schools of recent thought. It represents rather a critical reconciliation of rival philosophies of the type of Kantian apriorism and John Stuart Mill's empiricism.

JUSTUS VON LIEBIG: HIS LIFE AND WORK, 1803-1873. By W. A. Shenstone, F.I.C. New York: Macmillan & Company, 1895. Pp. 219. 16mo. Portrait. Price \$1.25.

The name of Liebig is familiar to all who are in any way acquainted with the science of chemistry, but many will doubtless like to have had a clear idea of why chemists admire and esteem him. The author has found that the prevailing impression concerning Liebig was that he was a man who gained a large fortune by making extract of beef. He has, therefore, made it his object in writing this little book, not so much to dwell upon Liebig's private life as to tell what he was, what he did and why all chemists and those who are versed in the history of science admire and esteem him so greatly. The work is written in admirable style and gives details of his great discoveries in pure chemistry, fermentation and agricultural and physiological chemistry.

WASHINGTON; OR, THE REVOLUTION. A drama founded upon historic events of the war for American independence. Part I. By Ethan Allen. Chicago: F. T. Neely, 1895. Pp. 212. 12mo. Illustrated. Price 50 cents.

This drama is divided into two parts; each part consists of five acts. The chief aim of the author has been to secure to the reader a personal intimacy with the actor in the great struggle which made the United States of America.

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(6629) J. R. says: Will you kindly tell me through your valuable columns how to make a hair stain from walnuts? A. The simplest form is the expressed juice of the bark or shell of green walnuts. To preserve the juice, a little alcohol is commonly added to it with a few bruised cloves, and the whole digested together, with occasional agitation, for a week or fortnight, when the clear portion is decanted, and, if necessary, filtered. Sometimes a little common salt is added with the same intention. It should be kept in a cool place. The most convenient way of application is by means of a sponge.

(6630) G. W. H. says: Will you kindly publish the process of making beef, iron and wine? A. Liebig's extract of beef 1/2 ounce avoirdupois, ammonio-citrate of iron 256 grains, spirit of orange 1/2 fluid ounce, distilled water 1 1/2 fluid ounce, sherry wine sufficient to make 16 fluid ounces. Dissolve the ammonio-citrate of iron in the water, dissolve the extract of beef in the sherry wine, add the spirit of orange and mix the solutions.

(6631) J. E. S. asks: Does a wheel go around the axle? Does the outside of a wheel go around the hub? A. There is much misapprehension in the numerous phases of this class of questions. A wheel as a whole does not go around the axle, although all of its parts revolve around the axle when it is running. The hub turns with the rim, and although there is no change of relative position of parts of rim and hub, yet it may be truly said the rim goes around the hub, for every part of the rim is consecutively on every side of the hub.

(6632) H. E. H. asks how to estimate the force of a blow made by a steam hammer, when the end of piston serves as the hammer; also would there be much diminution of the force of the blow, if transmitted through another piece of metal held tightly against the object to be hammered? Is there any way by which the force of a blow from a hammer actuated by a spring can be determined? A. The force of a blow in a steam hammer, and other forces, are explained and the method of computation carried out with examples in SCIENTIFIC AMERICAN SUPPLEMENT, No. 862. There will be a considerable diminution of the force in transmitting a blow through another body, depending upon its weight and rigidity. Cast steel, when hardened, being the most rigid of the metals for transmitting a blow. The force of a blow from a hammer actuated by a spring may be known by the method of computation for a steam hammer; and the weight and the actual pressure of the spring, with the acquired velocity, being the elements for computation, as shown in the article on "Impact or the Force of Percussion," in the SCIENTIFIC AMERICAN SUPPLEMENT as above named.

(6633) G. M. asks for a rule used for calculating the contents of a barrel. A. To find the volume of a cask of any form. Add together 39 times the square of the bung diameter, 25 times the square of the head diameter, and 25 times the product of the diameters. Multiply the sum by the length, and divide by 26,470 for United States gallons.

INDEX OF INVENTIONS

For which Letters Patent of the United States were Granted

October 1, 1895,

AND EACH BEARING THAT DATE

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

Table listing inventions with names and patent numbers. Includes items like Air brake, Bicycle support, and various mechanical devices.