

cool, elastic, and tough, without knowing the purpose for which you wish to use it. Porcelain is such a substance. Celluloid is another. But possibly neither of these will meet your requirements. The force necessary to straighten out a hook 1/2 inch wide, 1-16 of an inch thick, bent in the form of a loop 5-16 of an inch in diameter, will be about 180 pounds. This will vary somewhat with the character of the steel. We have figured on an open-hearth steel, with a tensile strength of about 70,000 pounds per square inch. If tool steel were used, the force required would be about twice as great. A factor of safety should be allowed if this is to be used in construction, which would reduce this figure to about 1/4 or 1-6 of the amount given above.

NEW BOOKS, ETC.

LE COÛT DE LA FORCE MOTRICE, LE LABOURAGE ELECTRIQUE. Par Emile Guarini, Professeur à l'Ecole d'Arts et Métiers de Lima. Paris: H. Dunod et E. Pinat. 8vo., 28 pages, 22 illustrations. Price, 50 cents.

The author, after comparing the cost of the motive power produced by man, the horse, the ox, and the electric motor, discusses at length the use of the latter in undeveloped countries, such as Peru. Plowing is next studied, the conclusions drawn being in favor of electricity as a tractive agent. Details of electric plows, motor vehicles, etc., with explanatory drawings, complete this unique monograph in a most practical manner.

A PRACTICAL GUIDE FOR AUTHORS. By William Stone Booth. Published by Houghton, Mifflin & Co. 180 pages. Price, 50 cents.

The author of this little book has some excellent advice to young authors and much of it could be well utilized by authors of experience. While the rules forming the text seems obvious yet the patience of editors is constantly being tried by manuscripts that are not properly prepared and which had the author known, or knowing had heeded, the labors of the book-makers from editors to proof-readers would be very considerably lightened. About a third of the book is devoted to the preparation of manuscripts; offering a MS. to publishers; royalties; dealing through literary agents; copyrights; serial rights, and agreements. The necessary amount of space is given to proofreading and the signs used in proofreading, while the rest of the book contains American and English rules for spelling and pronunciation; rules for French and German spelling and the division of Latin and Greek words. Thus it will be seen that the book covers those points that many aspiring authors are in the dark about and a perusal of this volume will quickly enlighten them.

SUB UN ORGANE NON DECRIT DU THORAX DES FOURMIS AILEES. Par Charles Janet. Extrait des Comptes Rendus Hebdomadaires des Seances de l'Académie des Sciences, Paris.

A description of two diaphragms in the thorax of ants, which have never before been noted. These organs, found alike in the male and female, no doubt serve to produce a displacement of the blood during the periods of repose of the vibratory wing muscles, or after the disappearance of these muscles.

CLOVERS AND HOW TO GROW THEM. By Thomas Shaw. New York: Orange Judd Company. 12mo.; cloth; 349 pages. Price, \$1.

Clovers play a very important part in American agriculture in a number of ways. As a fodder, for pasturage, as a honey-producer for bees, and as a soil-enricher, clover, in some one of its varieties, can be called into service. Chapter I of this work is an outline of its nature, scope, and plan. Chapter II deals with the facts and principles that relate to the growing of clovers in general. Chapters III to XI inclusive treat of individual varieties, a chapter being devoted to each variety. Chapter XII is devoted to a brief discussion of miscellaneous clovers, which have been but little grown in this country or are of but local interest. The author has devoted space to each kind in relation to its importance.

COLORING MATTERS FOR DYEING TEXTILES. With numerous engravings and diagrams. By Prof. J. J. Hummel. New and revised edition. Edited by Paul N. Hasluck. Philadelphia: David McKay. 16mo.; cloth; 160 pages. Price, \$1.

The field of aniline colors is so great, that a work embodying all the knowledge possessed on the subject would be prohibitive in its size. This little handbook contains a selection of the more important colors in technical use, and a sufficient amount of the theoretical principles covering their action.

LOCOMOTIVES: SIMPLE, COMPOUND, AND ELECTRIC. By H. C. Reagan. Fifth edition, revised and enlarged. New York: John Wiley & Sons. 8vo.; cloth; 932 pages; 494 illustrations. Price, \$3.50.

This edition has been revised by the author to include the latest developments of steam and electric locomotives. The development of the steam locomotive includes the balanced four-cylinder compound and the steam superheater.

The principle of compounding has been described in full as applied to locomotives both in the United States and foreign countries, involving the use of two-, three-, and four-cylinder engines. A chapter has been devoted to foreign-built compound engines, some types being described which are not modern, because they show the efforts put forth at their respective periods to improve the compound locomotive, and they form part of the evolution of the compound engine. The rapid development of the electric locomotive, and its use on trunk-line operations, require the treatment of the construction and operation of the electric locomotive in great detail, together with the apparatus essential to the generating and transmitting of the current which operates the locomotive. The principles of the generating and translating apparatus and the method of application are explained. The systems of construction and operation of the electric locomotive are described, to wit: The single-phase system, using single-phase motors; the poly-phase system, using induction motors; the three-phase system of generation and transmission, using rotary converters, with direct-current motors on the locomotive; the three-wire, direct-current system and the simple direct-current system, using a trolley and ground return. The methods of control and the electric brake-apparatus are described.

PUMPS AND HYDRAULIC RAMS. Edited by Paul N. Hasluck. With numerous engravings and diagrams. Philadelphia: David McKay. 16mo.; cloth; 160 pages. Price, 50 cents.

Pumps are so much a necessity, and hydraulic rams furnish such easy means for supplying water to country houses, that a popular treatise on the subject is not without use. Although this work deals with all forms of pumps and of rams, from the simplest to the most complicated, the illustrations are so clear and the descriptions so well written that they can be understood without any difficulty.

INSTRUCTIONS FOR THE INFANTRY PRIVATE OF THE NATIONAL GUARD. By Capt. John W. Norwood, late First Lieutenant 23d United States Infantry. New York: Arms and the Man Publishing Company. 80 pages. Price, 25 cents.

The National Guard to-day is composed of men willing and anxious to become proficient in their duties, but opportunities for drill and instruction under the supervision of company officers are necessarily limited. The various textbooks and regulations require a certain amount of technical knowledge and experience for the proper understanding of them. "Instructions for the Infantry Private of the National Guard" enters into an elementary discussion of the subjects which are most important to the private. It treats of military courtesy, discipline, customs of the service, camp duty, and guard duty in an interesting and entertaining way. To the important subject of rifle practice much space is given. The appearance of the book at the present season makes it of special value for those about to go into camp. It is made up in handy book form, completely indexed for ready reference.

AMERICAN MAGAZINE OF AERONAUTICS. Published monthly at 142 West 65th Street, New York. Ernest La Rue Jones, Editor. Price, \$3 per annum.

We welcome this addition to the literature of aeronautics. The necessity of such a journal is apparent when the importance of this field is considered. Aeronautical journals are few in number the world over, and every creditable addition will be eagerly sought after. Among the articles in this initial number are: "Aeronautics at the Jamestown Exposition," by Israel Ludlow; "Conditions of Success with Flying Machines," by O. Chanute; "Theory of Balloon Leakage," by A. F. Zahm, Ph.D.; "English Aero Club Exhibition," by Wilbur R. Kimball. Among the other articles are: "First Private Aerodrome in America"; "The Aero Club of Philadelphia"; "Gordon Bennett International Aeronautic Cup Race"; "Progress in Aeronautics"; "Aero Club of America"; "Aeronautics in England," etc. Twenty-five cents will bring a sample copy, and its perusal will prove profitable.

SELF-PROPELLED VEHICLES. A Practical Treatise on the Theory, Construction, Operation, Care, and Management of all Forms of Automobiles. By James E. Homans. Sixth Edition, revised and enlarged. New York: Theodore Audel & Co. 8vo.; cloth; 598 pages; 500 illustrations. Price, \$2.

Although the automobile is an element of modern life that has too firm a hold to be easily shaken off; and although its design and construction have been brought to a very dependable degree of efficiency and simplicity, the driver of motor cars has many problems to face. To answer every question that might arise would be too vast a task; but to anticipate each question by explaining the underlying principle, though difficult, is a task that can be accomplished. The course followed is to take each part of the mechanism, to describe principles governing its operation, and then to take up in detail the leading types in use. In this manner, every phase of automobilism is dealt with, from the putting on of tires to steam gages.

CASEIN. Its Preparation and Technical Utilization. By Robert Scherer. Translated from the German by Charles Salter. London: Scott, Greenwood & Son. New York: D. Van Nostrand Company. 8vo.; cloth; 163 pages. Price, \$3.

The casein industry, though limited at present, offers dairymen a growing market for their skimmed milk, a purely waste product of the cream-separator. The uses to which casein can be put are so numerous that it must, in time, become a product of the greatest importance, replacing, perhaps, celluloid and similar compounds in their universal usefulness. Mr. Scherer, in his translation from the German of Charles Salter, takes up the subject from the beginning. He first tells of the preparation of the compound, of its origin, and of its properties, and then how it can be used. The description of its uses is a practical handbook, containing in nearly every case the full recipe and directions.

INDEX OF INVENTIONS

For which Letters Patent of the United States were Issued for the Week Ending July 23, 1907.

AND EACH BEARING THAT DATE (See note at end of list about copies of these patents.)

Table listing inventions with patent numbers and dates. Includes items like Abrading apparatus, Acid chamber, Adding machine, Aerial navigator, Air brake coupling, etc.

Table listing inventions with patent numbers and dates. Includes items like Caster for drying racks, Cathode, Cellulose manufacturing, Cement burning method, Centrifugal machines, etc.