purpose for which you wish to use it. Porce- scribed in full as applied to locomotives both in lain is such a substance. Celluloid is another. the United States and foreign countries, in-But possibly neither of these will meet your volving the use of two-, three-, and four-cylrequirements. The force necessary to straighten inder engines. A chapter has been devoted to out a hook 1/4 inch wide, 1-16 of an inch foreign-built compound engines, some types thick, bent in the form of a loop 5-16 of an being described which are not modern, because inch in diameter, will be about 180 pounds. they show the efforts put forth at their re-This will vary somewhat with the character of spective periods to improve the compound locothe steel. We have figured on an open-hearth motive, and they form part of the evolution steel, with a tensile strength of about 70,000 of the compound engine. The rapid developpounds per square inch. If tool steel were ment of the electric locomotive, and its use used, the force required would be about twice on trunk-line operations, require the treatment as great. A factor of safety should be allowed of the construction and operation of the elecif this is to be used in construction, which tric locomotive in great detail, together with would reduce this figure to about ¼ or 1-6 of the apparatus essential to the generating and the amount given above.

NEW BOOKS. ETC.

LE COÛT DE LA FORCE MOTRICE. LE LAROUR-AGE 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 Wil-Price, 50 cents.

The author of this little book has some excellent advice to young authors and much most complicated, the illustrations are so of it could be well utilized by authors of ex. clear and the descriptions so well written that perience. While the rules forming the text they can be understood without any diffiseems obvious yet the patience of editors is culty. 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 proofreaders 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.

SUR UN ORGANE NON DECRIT DU THORAX DES FOURMIS AILÉES. 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 pages. Price, \$1.

Clovers play a very important part in American agriculture in a number of ways. addition will be eagerly sought after. Among As a fodder, for pasturage, as a honey-producer for bees, and as a soil-enricher, clover, nautics at the Jamestown Exposition," by Israel in some one of its varieties, can be called into Ludlow; "Conditions of Success with Flying in some one of its varieties, can be called into Luulow; "Conditions of Success with Flying 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 closes its service. Among the ether of the service of closes its service. to the growing of clovers in general. Chapters III to XI inclusive treat of individual varieties, Aerodrome in America"; "The Aero Club of a chapter being devoted to each variety, Philadelphia"; "Gordon Bennett International Accounting of the action of the ac 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 dia-grams. By Prof. J. J. Hummel. New

cool, elastic, and tough, without knowing the. The principle of compounding has been detransmitting 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 con-struction and operation of the electric locomotive are described, to wit: The single-phase system, using single-phase motors; the polyphase system, using induction motors; the three-phase system of generation and trans mission, using rotary converters, with directcurrent 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 en gravings and diagrams. Philadel phia: David McKay. 16mo.; cloth; 160 pages. Price, 50 cents.

Pumps are so much a necessity, and hydraulic rams furnish such easy means for supliam Stone Booth. Published by plying water to country houses, that a popular Houghton, Mifflin & Co. 180 pages. treatise on the subject is not without use. 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

INSTRUCTIONS FOR THE INFANTRY PRIVATE

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.

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 y compression of the large of the l We welcome this addition to the literature of aeronautics. The necessity of such a journal Judd Company. 12mo.; cloth; 349 is apparent when the importance of this field is considered. Aeronautical journals are few in number the world over, and every creditable Aerodrome in America"; "The Aero Club of Aeronautic Cup Race;" "Progress in Aero-nautics"; "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

CASEIN. Its Preparation and Technical Utilization. By Robert Scherer. Translated from the German by Charles Salter. London: Scott, 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 hand book, containing in nearly every case the full recipe and directions.

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AND EACH BEARING THAT DATE

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