

current into the line was so great that it set the motor in motion. This was not a short circuit, since the resistance of the motor was sufficient to prevent that, but it was enough to run the motor. We have seen lamps burned out on a line in the same circumstances, lamps which were not turned on at all by a burn-out on the same line near them.

(9502) G. F. G. asks: Can you make clear to me the difference of the terms "force" and "energy"? I am studying physics, and find difficulty in understanding just what is force and what energy. Anything you can furnish me with will be appreciated. A. Force is that which produces, changes, or destroys motion. Energy is the power to do work. Put forth your energy, and you can exert force in working upon bodies. Energy is not force; it is that in you which makes you feel that you can do something. Energy in a moving body enables it to do work upon some other body. Energy in a weight which has been raised to a height enables it to do work by falling from that height. Steam in a boiler has energy or ability to do work, but it is not doing any work so long as it is shut up in the boiler. Let it out into the cylinder, and it will exert force in pushing the piston to and fro, and thus do work in moving the train. Force does work. The energy or ability to do work can be measured in terms of the work which might be done if the energy were turned into work. The three words energy, force, work, stand in a logical series, and each has its place. Energy is not force except by an incorrect use of words, and force is not work.

(9503) M. M. asks: 1. Are dry batteries after having run down and been recharged from dynamo as good as originally? A. A dry cell cannot be made as good as at first by recharging. The so-called recharging consists in sending the zinc back to the positive end of the cell, and thus rendering it possible to use the cell as a source of current again. It will perhaps give about one-half as much as at first. If the electricity for recharging costs anything, it is probably not worth the doing. 2. Can "1900" type dry batteries be recharged from direct-current generator giving 3 amperes at 10 volts? A. Any dry cell can be recharged. Only a direct-current can be employed for charging storage cells or recharging dry cells. 3. How many, and how should they be connected? A. Five or six may be connected in series and connected to the dynamo. Connect the positive pole of the dynamo to the carbon, and the negative pole to the zinc of the series to be charged. 4. If it is possible to connect six in series, how long would it take to charge them? A. We cannot tell how long to continue the charge, except to say use a voltmeter and charge till further charging produces no further increase of voltage in the cells.

(9504) H. P. S. asks: Will you please give an explanation of the phenomenon which I noticed lately? I was developing films from a film pack, and each time I had to tear off a black paper, which was attached to the film by means of a silk adhesive strip; each time I noticed a glow, which followed up the parting of the paper and adhesive strip between the two. My explanation for it was that there was electricity formed by the parting of the molecules of the two parts. Was I right? A. The light which you observed in pulling a silk strip from a dry paper was due to the charge of electricity produced by friction. There are many cases of this in cold weather, especially. Stroking a cat in the dark, one may see the flashing of light from her dry fur. It does not appear to be necessary to consider it due to molecular action.

(9505) T. A. asks: 1. Can you please let me know, through your "Notes and Queries" column, how to make a choke coil such as is used for wireless telegraphy? A. A choke coil is usually wound with a wire core, but may have a great variety of windings according to the idea of its designer. Some have omitted the wire core. You will find a variety of designs in Mayer's "Wireless Telegraphy," which we send for \$2, mailed. 2. Will you also explain how it stops the waves from going through the relay and battery instead of the coherer? A. The action of a choke coil is a self-inductive one. The rapidly alternating surges of electric waves is greatly impeded by the induction of the turns of the choke coil upon each other. Alternating currents are frequently controlled by choke coils, just as direct currents are cut down by rheostats.

(9506) C. H. S. asks: 1. What is the extent and knowledge of the Sargasso Sea, and is it true that part of the ocean equal to one-half of Europe is entirely unexplored? A. The Sargasso Sea is an area destitute of currents, a quiet place in which there are many varieties of sea weeds and lower forms of animal life. It extends from 25 deg. to 35 deg. N. latitude, and from 20 deg. to 30 deg. W. longitude. It owes its character to the fact that the water is not in motion. It is not probable that any extent of ocean except in the frigid regions has not often been crossed by ships. Atlases do not show any such unexplored region of ocean as you describe. 2. Do astronomers still hold that Venus revolves only once in a year? A. It is probable that Venus rotates on its axis once in a revolution around the sun, or once in one of its years.

(9507) F. S. P. asks: Will you kindly

inform me, through your answer to Inquiry department, what is the theory of the firefly's light? Or in other words, what use to the bug is its light? A. The theory advanced as to the purpose of the firefly in displaying its light is that it is a sexual call, just as is the mating song of birds. We have never met any other, and this seems sufficient.

(9508) S. E. O. asks: Will you kindly let me know what kind of chemical it is that changes color with the change of weather? I have a small piece of goods about two inches square, that in clear weather is a blue; when a change is near it turns to violet, and for rain it turns to bright pink. If you can tell me the name of the chemical you will oblige me very much. A. The cloth which changes color with a change of weather is dyed with chloride of cobalt. The change is due to moisture. You can produce it by breathing upon the cloth; it does not indicate a change of pressure of the atmosphere as a barometer does, and hence is usually behind the change of weather. The barometer indicates the cause of the storm; the color indicator shows the effect of the storm.

NEW BOOKS, ETC.

HINTS ON REVOLVER SHOOTING. By Walter Winans. New York and London: The Knickerbocker Press, 1904. 16mo.; pp. 130. Price, \$1.

A revolver in itself is a very useful weapon of defense; but unfortunately, many people are not able to use it properly. It is the object of the present little book to give such instructions as will enable anyone to select, sight, and fire a revolver. The book deals with the competitions at Bisley, England, stage shooting, trick shooting, etc.

THE POLISHING AND PLATING OF METALS. A Manual for the Electroplater, Giving Modern Methods of Polishing, Plating, Buffing, Oxidizing, and Lacquering Metals, for the Progressive Workman. By Herbert J. Hawkins. Chicago: Hazlitt & Walker, 1904. 12mo.; pp. 355. Price, \$2.

There is considerable call for a new work on plating, to deal with the conditions as we now find them. It is a thoroughly practical work, giving valuable rules and formulae. It is a book which should be welcomed by all electroplaters.

ELECTRICAL ENGINEERING FOR STUDENTS. By S. R. Bottone. London: Guilbert Pitman, 1904. 16mo.; pp. 153. Price, 80 cents.

The works of Mr. Bottone have been numerous, and have proved very helpful to the amateur. The present volume will prove no exception to the rule. It is divided into two parts, the first dealing with magnetism and magnetic apparatus, while the second part treats of static electrical instruments. The book will be of particular value to those who are desirous of obtaining practical knowledge of electrical work, and find themselves hampered by their inability to see or to make the instruments of which they read in textbooks.

LETTERS ON THE DISEASES OF PLANTS. By N. A. Cobb. Sydney, Australia: The Government of the State of New South Wales, 1904. Pp. 133.

This book is reprinted from the Agricultural Gazette of New South Wales, with additions and emendations. There are over 150 original illustrations and 7 original colored plates, together with 4 plates copied from various authors. It is a very creditable production.

THE PURIFICATION OF SEWAGE. Being a Brief Account of the Scientific Principles of Sewage Purification and Their Practical Application. By Sidney Barwise, M.D. (Lond.), B.Sc., M.R.C.S., D.P.H. (Camb.) With numerous illustrations and diagrams. New York: D. Van Nostrand Company; London: Crosby Lockwood & Son, 1904. 8vo.; pp. 240. Price, \$3.50.

The progress which has been made during the last few years, more particularly in the mechanical arrangements for making percolating filters automatic and in the distribution of sewage, has necessitated the rewriting of the present work so as to bring it up to date. This work is written by an English medical health officer, and it shows painstaking care in its preparation. It will be useful to all sanitary engineers and bacteriologists.

ANALYSE DES MATIÈRES ALIMENTAIRES ET RECHERCHE DE LEURS FALSIFICATIONS. By Ch. Girard, Director of the Municipal Laboratory of Paris, in collaboration with MM. Sanglé-Ferrière and De Brévans, Sub-Chiefs of the Municipal Laboratory, and MM. Truchon, V. Genin, Pons, De Raczowski, Leys, Froideveaux, Cuniasso and Lafaye, Chemists of the Municipal Laboratory. Paris: Vve. Ch. Dunod, 1904. 8vo.; pp. 872, with illustrations. Price, \$7.50.

The present, or second, edition of this volume contains some 200 pages more than the first edition; and besides the original articles by MM. Bordsas, Saglier, Ladan-Bockairy, Robin, and P. Girard, which were published in the former edition, there is much supplementary material, in which the latest methods of analy-

sis and research have been described with the greatest care, thus bringing to the knowledge of chemists and pharmacists the latest scientific novelties concerning the analysis of food products. Several additional articles, such as those on water, milk, preserves, etc., contain new and interesting facts; while others on saccharimetry, the analysis of sugars and of sugary substances, are entirely new. Because of their clear presentation, the methods here described permit the chemist, with the aid of tables and numerous examples, to comprehend with the greatest facility the slightly complex calculations which belong to these delicate researches. The book treats successively of potable waters, wine, beer, cider, vinegar, alcohols and spirits, milk, butter, cheese, oils, meats, cereals, farinaceous products, bread, cakes and cake making, coffee, chicory, tea, cocoa, chocolate, sugars, preserves, food products, spices and aromatics, colors employed in food materials, etc. Independently of chemical analysis proper, the bacteriological and bibliographic parts of the work have been largely added to, and their connection with the former articles constitutes a work indispensable to all persons interested in the hygiene of foods.

SELF-PROPELLED VEHICLES. A Practical Treatise on the Theory, Construction, Operation, Care, and Management of All Forms of Automobiles. By James E. Homans, A.M. New York: Theodore Audel & Co., 1904. 8vo.; pp. 672. Price, \$2.

An excellent book, dealing with the practical side of the construction and operation of automobiles. We do not know of any more useful book for those who wish to understand the mechanism of various types of automobiles. The present is a revised edition, and it contains complete illustrated descriptions of the latest American automobiles and auto novelties.

AN INTRODUCTION TO THE MODERN THEORY OF EQUATIONS. By Florian Cajori, Ph. D. New York: The Macmillan Company, 1904. 12mo.; pp. 239. Price, \$1.75.

Most textbooks, particularly on mathematical subjects, can hardly be called books of instruction, as they seem to take it for granted that the student is thoroughly familiar with the subject, instead of taking the position that the student is ignorant of the subject and all details thereof must be explained to him. Dr. Cajori is known as a man who writes clearly and interestingly on subjects of difficult nature. His present work is no exception to this rule; the arrangement is new, and while the subject-matter is of course old, his handling of it is quite different from the usual. Particular attention is paid to exercises, making the subject more concrete. The Galois theory of equations, which is usually found by the beginner quite difficult of comprehension, is specially dealt with.

L'OZONE ET SES APPLICATIONS INDUSTRIELLES. By H. de la Coux, Engineer, Chemist, and Inspector of Technical Instruction for the Minister of Commerce. Paris: Vve. Ch. Dunod, 1904. 8vo.; pp. 557; 159 figures. Price, \$4.50.

In this new work M. de la Coux, after having described ozone in its physiological and therapeutic rôle, studies its methods of preparation, and treats of the considerations which influence its economic preparation. The new industrial ozone generators are also described. There are some remarkable properties shown by this gas from the chemical point of view. Certain of these are utilized in the preparation of particular products, which the author acquaints us with. Ozone acts energetically on microbes, and the sterilization of water, air, and various other substances is obtained with it. Each of these subjects has been the object of a special article, showing the complete processes and installations involved. The application of ozone to the treatment of brandies, spirits, and wines, to the manufacture of vinegar and cider, and to distillation, is also thoroughly described. Its use for the whitening of textile fibers, tissues, paper, straw, wax, feathers, etc., is described at length, as well as its use in starch making and in the manufacture of dextrines. After having gone thoroughly over the subject of the use of ozone in the manufacture of oils, greases, soap, varnish, lacquer, etc., its use is also described in the preparation of perfumes and coloring materials, and in dyeing. Among other uses to which ozone is being put are its employment in silkworm culture, in the aging of woods, in bleaching, the disinfection and sterilization of linen and tissues, and in photography. Finally, the analysis of ozone, which is so useful in the control of these various operations, has been very completely described from the qualitative and quantitative point of view.

THE STUDY OF AMERICAN COALS. By William Jasper Nicolls, M.Am.Soc.C.E. Philadelphia and London: J. B. Lippincott Company, 1904. 8vo.; pp. 396. Price, \$2.

Primarily this work is designed for those who wish to be informed on the subject of coal without searching through scattered publications. The writer has gathered the material from every available source, and has added it to his practical knowledge gained by experience in the coal fields of Pennsylvania. The book is an interesting one, and deals with the

origin, development, transportation, and consumption of coal. The whole range of the subject is dealt with, from the theories of the origin of coal and the geology to the by-products. It is very interesting, and its usefulness is not confined to operators, miners, dealers, and carriers; but to the multitude of consumers—the American people.

NOTES ON THE COMPOSITION OF SCIENTIFIC PAPERS. By T. Clifford Allbutt, M.A. London: Macmillan & Co., Ltd.; New York: The Macmillan Company, 1904. 12mo.; pp. 154. Price, \$1.

While this is primarily intended as an aid to students in writing scientific theses, many of our popular writers of fiction and of fact might profitably consider the principles and the methods here laid down. It is a really excellent little "preachment," as Fra Elbertus would say.

OPTICAL TABLES AND DATA. For the Use of Opticians. By Silvanus P. Thompson, D.Sc., F.R.S. London: E. & F. N. Spon, Ltd.; New York: Spon & Chamberlain, 1900. 12mo.; pp. 281.

As its title indicates, a compilation of tables and information for opticians and others, in notebook form.

THE ACADEMIC REVIEW OF ARITHMETIC WITH QUESTIONS AND PROBLEMS. By Guy E. Transue. Clarksville, Mich.: G. E. Transue, 1902. 12mo.; pp. 281.

This book has been written for review purposes only, and it contains the pith of all the best arithmetical works which have come to the author's notice. The first part of the book is devoted to the science of the subject and analysis of processes, and the second part to mechanics and business. A new method of finding the exact divisors of any given numbers will be found most useful. Simple mechanical drawing, with practical measurements and considerable data of value to those interested in the mechanical trades, will also be found in its pages, as well as a considerable amount of information on the making of notes, figuring of interest, etc.

CARBURATION ET COMBUSTION DANS LES MOTEURS A ALCOOL. By E. Sorel. Paris: Vve. Ch. Dunod, 1904. 8vo.; pp. 280. Price, \$2.50.

Much has been said, *pro* and *con*, regarding the employment of alcohol in explosive motors. Its adherents declare that it can be substituted for gasoline in any motor, and that it does not leave any disagreeable odor or produce any smoke. Its detractors claim that it produces acids which attack the cylinders and valves, causing the latter to stick to their seats after the motor has cooled off. These praises and reproaches are not well founded. All depends on the circumstances under which it is used, and the method of producing the mixture of air and the combustible. M. E. Sorel, in this new work, indicates the conditions under which alcohol can be successfully used. He compares alcohol with the other hydrocarbons, and then studies various parts of the motors, especially the carbureters, which influence its use. Finally he makes known the laws which govern the phenomena of combustion, and which are generally not well understood by the constructors of this type of motor. The book has complete tables of the various fuels used in automobile motors, and of their conditions at different temperatures. The temperature of vaporization of these fuels is gone into very thoroughly. Many other points that bear on the subject are discussed. The book will be found most valuable to constructors of explosive motors of all types.

ELEMENTS OF MECHANICAL DRAWING, THEIR APPLICATION, AND A COURSE IN MECHANICAL DRAWING FOR ENGINEERING STUDENTS. By Alfred Pierce Jamison, M.E. New York: John Wiley & Sons, 1904. 8vo.; pp. 226. Price, \$2.50.

This textbook is intended to give the student such knowledge as will prepare him for a course in engineering, besides aiding him in obtaining sufficient practice in drawing to qualify him to do ordinary commercial drafting. The text is amply illustrated with samples of lettering, sample plates, descriptions of instruments, and the like. It is written largely in the form of problems and their solutions and there are also chapters on mechanical execution of drawings, sketching, color work, and the reproduction of drawings. The chapter on projection goes into the subject thoroughly, yet concisely. The book, as a whole, is a complete handbook for draftsmen.

ETUDE THÉORIQUE DES ALLIAGES MÉTALLIQUES. By Leon Guillet. Paris: Vve. Ch. Dunod, 1904. 8vo.; pp. 232; 117 illustrations. Price, \$2.75.

Alloys have, from an industrial point of view, a considerable importance; it is, in fact, rarely that metals are employed in their pure state. Recent researches on alloys have shown that physical, chemical, and mechanical properties of these products depend essentially on the state of the different metals that enter into the compound. It is, therefore, of great interest to determine exactly this state. The aim of the present work is to study the different methods which will lead to this knowledge, to show all the conclusions that have already been drawn from such knowledge, and to describe the different alloys utilized in the industries. The

(Continued on page 448)

work is essentially theoretical in character, the author having recalled the law of phases on which the theory of alloys is based. In the following chapters he has studied the curves of fusibility and of cooling, microscopic metallography, etc.; in fact, all the methods which conduce to clearing up the constitution of metallurgical products. Each chapter contains three divisions, which give: (1) the principle; (2) the methods; and (3) the examples. The examples have been drawn in every instance from important works treating of siderurgical products, and to which are attached particularly the names of MM. Le Chatelier, Osmond, and Hadfield.

HISTORY OF COMPOSING MACHINES. By John S. Thompson. Chicago: The Inland Printer Company, 1904. 12mo.; pp. 200; fully illustrated. Price, \$3.

This book gives a good description of almost every typesetting machine of any importance which has come into practical use. Over sixty different machines and processes for setting type mechanically are illustrated and described, and the entire art of mechanical typesetting is reviewed in detail. The book will be found most valuable by all printers and others who have to do with printing, as a historical and reference work. It is completed by an accurate list of all patents, both British and American, which in any way relate to the subject. The book is extremely well illustrated with some fifty half-tone plates.

STORIES OF INVENTORS. By Russell Doubleday. New York: Doubleday, Page & Co., 1904. 8vo.; pp. 221; 33 illustrations. Price, \$1.25.

This book tells in a graphic way the interesting adventures of inventors and engineers, many of which adventures are incidents and personal experiences. Most well-known modern inventions, which are now in, or are rapidly coming into common use, are illustrated and described. Marconi and wireless telegraphy; Santos-Dumont and his flying machines; fast trains and their operation; automobiles and their various uses; steamboats, submarines, and life-saving apparatus are among the subjects touched upon. Other interesting stories are told of bridge builders and some of their achievements, while artificial ice-making, long-distance telephony, and moving pictures and typesetting machines each come in for a good share of descriptive matter. The book is well illustrated with fine half-tone plates reproduced from the *SCIENTIFIC AMERICAN* and the *Book-lovers' and Holiday* magazines. It will be found most interesting reading by all who wish to learn the romance of invention.

EXPERIMENTS WITH ALTERNATE CURRENTS OF HIGH POTENTIAL AND HIGH FREQUENCY. By Nikola Tesla. New York: McGraw Publishing Company, 1904. 12mo.; pp. 162. Price, \$1.

This book consists of a lecture delivered before the Institution of Electrical Engineers at London, in which are described some interesting experiments of the author on high potential and high frequency currents. An appendix contains an article on the transmission of electrical energy without wires, which was written as the result of experiments by Tesla with this end in view. The Appendix is illustrated with photographs of the author's experimental laboratory in Colorado and transmitting tower on Long Island for wireless telegraphy.

LA PRATICA DELLA FONDERIA. By Aurelio Aureli. Milan: Ulrico Hoepli, 1904. 8vo.; pp. 756; 528 illustrations. Price, \$5.

This volume forms a very complete treatise of Italian foundry practice as exemplified by some of the best Italian foundries. The author has had a large experience in foundry work in the Grande Fonderia della Società degli Altì Forni, and in other Italian foundries, and the results of this experience he has set forth very clearly in the present volume. The work is divided into fifteen chapters. The opening chapters treat of different kinds of steel and the various tests of steel, both mechanical and chemical. The different methods used in casting, refining, and treating steel are gone into at great length, and considerable attention is given to the manufacture of models from which to make castings. The work is very thoroughly illustrated by diagrams, and it also contains tables giving the composition of different steels. It will be found most useful by all persons who have to do with the steel industry.

SCAFFOLDING. A Treatise on the Design and Erection of Scaffolds, Gentries, and Stagings. By A. G. H. Thatcher, Building Surveyor. London: E. P. Batsford, 1904. New York: D. Van Nostrand Company. 8vo.; pp. 185; 152 illustrations. Price, \$2.

The practice of allowing workmen to erect scaffolds without the aid of expert supervision is strongly to be deprecated. The architect, builder, or clerk of works should always be held responsible for their erection. The risk of defective or unsafe work would thereby be minimized, and there would be found an economy of both labor and material. The author has endeavored in this work to give practical details of construction, and yet the theory of construction has also been treated in terms well understood in the building trade. The book treats of various kinds of scaffolds, scaffolds for special purposes, shoring and under-

pinning, timber, cordage and knots, the transport of material, the stability and strength of scaffolds, and scaffold accessories and their use. The prevention of accidents and the laws affecting scaffolding are also discussed. Besides numerous diagrams, the book contains six full-page plates reproduced from photographs of actual constructions.

TRATTATO DI CHIMICA INORGANICA GENERALE E APPLICATA ALL'INDUSTRIA. By Dott. E. Molinari. Milan: Ulrico Hoepli, 1904. 8vo.; pp. 693; 178 illustrations. Price, \$5.

This book treats of the preparation and manufacture of different chemicals. All the latest processes are described in detail in the second part of the work, while the first part is theoretical in character, and describes numerous laboratory experiments in connection with the preparation of various substances and gases. Like most of the volumes published by the Hoepli establishment, this one is exceedingly thorough and complete in dealing with the subject in hand. It will be found of great use to all inorganic chemists who are engaged in industrial work.

ALTERNATING CURRENT ENGINEERING. By E. B. Raymond. New York: D. Van Nostrand Company, 1904. 12mo.; pp. 232; 102 illustrations. Price, \$2.50.

Most of the treatises on alternating current engineering require a knowledge of calculus on the part of the reader, and the few works which avoid the use of calculus are only too apt to be filled with difficult algebraic problems. To the large number of young men who enter electrical lines of work without a technical education, such books are valueless. Mr. Raymond in his present work has realized the importance of avoiding all complex explanations, and the book is written in a very simple and clear style. The first part of the book explains the general laws of magnetism as applied to alternating work, and the second part deals with alternating apparatus describing the principles of design and operation, and giving the best methods of test.

THE WATERPROOFING OF FABRICS. By Dr. S. Mieczkowski. Translated from the German by Arthur Morris and Herbert Robson, B.Sc. New York: D. Van Nostrand Company; London: Scott, Greenwood & Co., 1903. 16mo.; pp. 104. Price, \$2.50.

There is hardly a single phase of technology that does not have its literature. There has been a great demand for literature on waterproofing, but the supply is meager, so that any contribution to the subject will be warmly welcomed. The author has performed his task in such a manner that the product will be useful to those who are interested in the manufacture of impermeable fabrics. The list of waterproof paints is an excellent one, and formulas are given.

SPECIAL METHOD IN ELEMENTARY SCIENCE FOR THE COMMON SCHOOL. By Charles A. McMurray, Ph.D. New York: The Macmillan Company, 1904. 8vo.; pp. 275. Price, 75 cents.

This book should be read by all teachers of natural science, as it contains many very good ideas, which will be found most helpful as an aid in the instruction of classes. The book goes into the history and aim of science teaching, and helps the teacher plan a course of study and simplify it as much as possible. The basis for selecting and arranging topics for the course of study is thoroughly discussed, as well as the gradual approaches to science, and the application of science to life. Method in science lessons is insisted upon, and the teacher is aided in obtaining this by means of several illustrative lessons and a complete outline of a course of study. The work is completed by a list of books which have been found valuable in science teaching.

LES RICHESSES MINÉRALES DE LA NOUVELLE-CALÉDONIE. By M. E. Glasser, Ingénieur au Corps des Mines. Paris: Vve. Ch. Dunod, 1904. 8vo.; pp. 560; 6 plates. Price, \$3.

M. E. Glasser, who was sent by the Minister of Colonies to study the mineral resources of New Caledonia, has given a very complete account of the same in his present report. After having discussed the general geological formations that are to be found in different parts of New Caledonia, the author makes known, for each class of mineral products, what are the sources of supply, the amount of development that has been done, and the industrial conditions under which the mines are exploited, as well as the development to which they appear capable of attaining. Nickel, cobalt, chrome, iron, copper, gold, coal, etc., are thus successfully reviewed. The author ends his volume, which is completed by a number of plates showing the mineral deposits, by considerations regarding the future of these mines and the measures to be taken in securing their values.

SUBJECT LIST OF WORKS ON ELECTRICITY, MAGNETISM, AND ELECTRO-TECHNICS IN THE LIBRARY OF THE ENGLISH PATENT OFFICE. London: The Patent Office, 1904. Price, 25 cents.

This list consists of two parts, as follows: a general alphabet of subject headings, with entries in chronological order of the works arranged under these headings; and a key or a summary of these headings shown in class or-

der. The headings have to deal with the contents of the works catalogued, and do not give necessarily the title pages, which are often misleading. The entries under the headings are arranged in chronological order, which will be found of considerable assistance to the investigation of matters of historical interest. The list comprises some 2,374 works, representing 3,792 volumes. The entries in the catalogues relating to these works are 2,948, and are distributed under 307 headings and sub-headings.

HOISTING MACHINERY. Including the Elements of Crane Construction and Descriptions of the Various Types of Cranes in Use. By Joseph Horner. Philadelphia: J. B. Lippincott Company, 1903. 12mo.; pp. 252; 215 engravings. Price, \$3 net.

This treatise is in four sections. Section 1 deals with the elements of crane construction; section 2, with the methods of operation; section 3, with the materials used in cranes, and their specific application; and section 4 with the various types of cranes, both hand and power. A full consideration of all the types now in use would require several large volumes; to present in concise form the leading features of those most in use has been the aim of the writer. By thus keeping the work within moderate limits, its value as a practical handbook has been enhanced, and reference facilitated.

TWENTY-SIXTH ANNUAL REPORT OF THE STATE BOARD OF HEALTH OF THE STATE OF CONNECTICUT. For the Year 1903. New Haven, Conn.: The Tuttle, Morehouse & Taylor Company, 1904.

While this public document should be of particular interest to the people of the Nutmeg State, its statistics and records are capable of a much wider and more general application. Subjects such as "The Death Rate Not a Criterion of Public Hygiene," "Water Filtration," and "The Influence of Vaccination on Human Life," should claim the attention of every member of a civilized community. The Report includes the registration records for 1902 relating to births, marriages, deaths, and divorces.

RADIO-ACTIVITY. An Elementary Treatise from the Standpoint of the Disintegration Theory. By Frederick Soddy, M.A. New York: The D. Van Nostrand Company; England: The Electrician Printing and Publishing Company, Ltd., 1904. 8vo.; pp. 214; 40 illustrations. Price, \$3.

In the present volume the author has attempted to give a connected account of the remarkable series of investigations which have followed M. Becquerel's discovery in 1896 of the new property of the element uranium. The discovery of this new property of self-radiance, or "radio-activity," has proved to be the beginning of a new science, in the development of which physics and chemistry are worked together in harmony. In these advances physics and chemistry have borne an equal share; and in the close communion of the two sciences throughout the investigations, the secret of rapidity and definiteness of progress is to be found. Radio-activity has passed from a position of a descriptive to that of an independent philosophical science, based upon principles, only the germ of which is to be found in physics and chemistry as they were understood before its coming. The author has gathered up scattered threads, and has woven them into a book which will be of great interest to the physicist and to the chemist. It is a thoroughly satisfactory treatise on a new phase of science, the literature of which is still in its infancy.

AMERICAN SMALL ARMS. A Veritable Encyclopedia of Knowledge for Sportsmen and Military Men. By Edward S. Farrow. New York: The Bradford Company, 1904. Quarto; 500 engravings. Pp. 408. Price, \$5.

The author of this book is a well-known writer on military matters, and is a late assistant instructor of tactics at the United States Military Academy. The book is well gotten up, is very comprehensive, and is quite the best book we have seen on the subject.

TEXTBOOK OF GENERAL PHYSICS FOR HIGH SCHOOLS AND COLLEGES. By Joseph S. Ames, Ph.D. New York: American Book Company, 1904. 8vo.; pp. 768; 427 cuts. Price, \$3.50.

The author of this textbook, in his capacity as Professor of Physics and Director of the Physical Laboratory of the Johns Hopkins University, has had a wide experience, and knows well the needs in treating of the subject in hand. Believing that the most important element in a physics course is a textbook which states the theory of the subject in a clear and logical manner, he has endeavored to give concise statements of experimental facts on which the science is based, and to present with these statements the accepted theories which correlate or explain them. The work is divided into six sections, as follows: Mechanics and Properties of Matter, Heat, Vibrations and Waves, Sound, Light, Magnetism and Electricity. Each of these sections is treated in a very lucid manner, and illustrated with numerous diagrams of experiments and pictures of apparatus. No experiment or observation which has an important bearing upon the subject in hand has been omitted, and the

book is so thoroughly up-to-date as to mention the recent discovery of the decomposition of radium into helium. We most heartily recommend the book for use in schools and colleges, as well as for a general handbook of physics.

IN ENGLISH HOMES. The Internal Character, Furniture, and Adornments of Some of the Most Notable Houses of England Historically Depicted from Photographs Specially Taken by Charles Latham. London: George Newnes, 1904. Imported by Charles Scribner's Sons, New York. Folio; pp. 453. Price, \$15.

The historical castles and mansions of England have ever been a favorite subject for the historian, the romanticist, and the artist. From the time, sixty years ago, when Nash published that justly renowned book "Mansions of England in the Olden Time" down to the appearance of the truly magnificent volume "In English Homes," which forms the subject of the present notice, the historic homes of England have been made more or less familiar to the world at large, through the agency of pen and pencil. It must be confessed, however, that it was not until the photographic art had attained something of its present excellence that the glories of English domestic architecture of the grander sort and of the art treasures which it enshrined, began to be known outside of the limited few that had the opportunity to study the subject in the capacity either of guest or casual visitor. It was inevitable that such photographic illustration of the subject as was done should be concerned mainly with exteriors; and while the public is fairly familiar at least with the external architecture of the most prominent of the mansions and castles of England, it is certain that many of the interiors have hitherto been a sealed book. It was, therefore, a happy inspiration that prompted the English publishers to undertake the formidable task of gathering in a single volume a series of views of the interiors of the most notable mansions of England and making the work, by virtue of its size, voluminous contents and really superb letterpress and engravings, to say nothing of the luminous historical text, fully worthy of the subject. The illustrations, in particular, bring one into such intimate touch, not merely with the broad sweep of these grand interiors, but with the intimate details of their decorations and furnishings, that in this work the engraver and printer seem to have reached the very acme of their art.

The appearance of this work at a time when Messrs. Munn & Co. are bringing out a volume dealing in similar manner with the great homes of America, is peculiarly opportune, inasmuch as the one forms a complement to the other. Together they cover very completely the broad subject of the grander domestic architecture of the two great branches of the English-speaking race.

"In English Homes," contains 453 pages, 11 x 16 inches in size, of heavy plate paper, and over 500 engravings, more than half of which measure 8 x 10 inches and have an entire page to themselves. The plates are in themselves superb specimens of the photo-engraver's art; and the selection of interior views has evidently been made, as indeed we are told in the historical introduction, by one to whom the work has been in the fullest sense a labor of love. The opening chapter is devoted to an historical introduction in which it is shown that the history of the domestic life of the aristocracy of England from feudal times down to the present day can very clearly be traced in the gradual development to its present perfection of the typical manor house and castle. The central feature of the Saxon house and Norman castle was the great hall, which was the place of living, eating and daily business of the feudal family. The hall of the Tudor or Stuart gentleman is the more modern form of the hall of the Norman baron, and the long galleries and withdrawing rooms of later centuries were the outward expression of the growing refinement and good taste which led the lord and lady to seek for a larger measure of retirement from the common throng. The story of the gradual evolution of the leading features of the modern great house such as the hall, the long gallery, the grand staircases, etc., is lucidly and most beautifully told in the splendid series of engravings that enrich this volume.

THE AINU SCHOOLS AT THE ST. LOUIS EXPOSITION. By Frederick Starr. Chicago: Open Court Publishing Company, 1904. 8vo.; pp. 118; illustrated. Price, 75 cents.

This interesting little volume contains a simple narrative of the author's journey in Yezo, and a description of the group of Ainus which he brought back with him for exhibition at the St. Louis Exposition. The various features of Ainu life are described, and the book is well illustrated with characteristic Ainu, their clothes, head-dress, weapons, etc.

ELECTRIC FURNACES AND THEIR INDUSTRIAL APPLICATIONS. By J. Wright. New York: The Norman W. Henley Publishing Company, 1905. 8vo.; pp. 288; 57 illustrations. Price, \$3.

This work, which we believe is the only American work on the subject, is of timely interest, owing to the rapid development of electrochemistry in the past few years. The book opens with a brief historical sketch of the

(Continued on page 450.)

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electric furnace. The succeeding chapters then describe very clearly the working principles of various types of furnaces, including many which have not yet passed the experimental stage. Electrolytic furnaces, though not strictly coming under the head of electric furnaces, are also described. The illustrations are in almost every case sectional diagrams, thus showing very clearly the different constructions.

THE WORLD'S WORK. St. Louis Fair Number. New York: Doubleday, Page & Co., 1904. 4to; pp. 200; numerous illustrations. Price, 50 cents.

The special Exposition number of the World's work, published last August, contains numerous fine half-tone illustrations of typical scenes at the St. Louis Fair, as well as articles on the Fair and what it commemorates; a new epoch in the use of power; transportation and the measure of progress; the people as an exhibit; Philippine peoples; Japan's extraordinary exhibit; the inspiring displays of the States; exhibits of pictures and sculpture; improvement of education; strange races of men; panorama of forestry, fish, and game; modern mining and its progress, etc. The number forms one of the best high-class publications on the World's Fair that we have seen.

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