has to produce another current in other wires in its neighborhood. By it all dynamos generate their currents; all induction coils produce their effects. The action is by means of the lines of magnetic force which was the subject of question 1. 10. If a wire gets overcharged why does it get heated, and what causes it? A. All wires are heated which carry an electric current. More current, more heat. A wire resists the flow of electricity through it, and the force necessary to push the electricity through a wire heats the wire. 11. A live wire 150 feet long has two other wires connected to it, each 50 feet long and 50 feet apart, and each in opposite directions to each other; each wire has four lamps, and last 50 feet of wire has also four lamps; lamps all the same and the same distance apart. Which lamps get the most power—the ones nearest the source of power, and if not, why? Kindly explain in full. A. The lamps nearest the source of current get the most current and are brighter than those further away. The mode of wiring shown in your diagram is for the purpose of equalizing the distances as much as possible. Swoope, page 426, gives some instruction about this. 12. Why does an alternating current flow in one direction and then in another or opposite direction; and when lamps are connected to same, why do they not go out when current is flowing away from them, and *vice versa*? A. An alternating current does not flow away from the lamps at any time. It flows through them in one direction and then through them in the other direction, but is going through them all the time in some direction. As the alternations are very rapid, too rapid for the eye to see, the lamp does not show the changes in current. With 120 alternations per second no one can see the flicker of the lamps; if there were only 10 per second every one could see the light rise and fall, as the current changed its direction of flow. 13. Knowing that a dynamo makes electricity from power and a motor makes power from electricity, how can a person know the difference between a dynamo and a motor by simply looking at same? A. There is no electrical difference between a dynamo and a motor. One may often be used for the other. A motor may often be told from a dynamo by knowing the usual shapes given to the two sorts of machines. 14. Why are connections with batteries, etc., made with the wires coiled like a spring? A. Connections with binding posts are made by coiling the extra wire in a spiral for the looks of the thing. Such a disposition of the extra wire presents a better and more finished appearance than to leave the wire hanging loosely and in unshapely loops. 15. Does electricity flow through a wire or around it, and if around it, why does not the electricity from one wire connect with all the others on a rainy day by following the water on a telegraph or telephone pole from wire to wire, as water is a good conductor? A. Electricity of low potential flows through the wire and produces a magnetic field around the wire. High potential electricity flows along the surface of the conductor and does not penetrate the body of the metal to any great degree. 16. What does single phase, polyphase, etc., mean? Having no knowledge whatever about electricity, and intending to work at same, you will greatly oblige me by answering the above questions. Can you give me the names of some good books, also prices of same on electricity? I mean books with the why, how, and wherefore of electricity, so that it can be understood by an average person. All the books that I have seen on the subject explain it too high up for one that does not know the theoretical and practical side of it. What I want to get at is the main underlying points of it, so that I can work up from same. A. Single phase, etc., are terms which refer to the shape of the waves of alternating-current electricity.

(9460) W. W. F. asks: Will you please inform me, if possible, where I can purchase a glass for examining the bottom of a lake where the water is about 30 feet deep, but clear. I understand such glasses are used but have never seen them advertised. A. A water telescope consists of a tube or box with glass in one end and the other open. It may be six to eight inches in diameter, large enough for both eyes to be used in looking into it. The inside should be painted a dull black and the whole may be three or four feet in length. It is placed in the water with one end under water, and the observer looks down through the glass tube into the water. The philosophy of the thing is that the ripples upon the surface of the water cannot affect the water in the interior of the tube, therefore the surface of the water in the tube is still and the eye can see clearly to considerable depth. It is not a telescope in the ordinary sense, but a simple and useful appliance for its designed purpose. A good quality of plate glass should be employed in the end of the tube. We are not aware that these instruments are on the market.

NEW BOOKS, ETC.

IN SEARCH OF A SIBERIAN KLONDIKE. As narrated by Washington B. Vanderlip, the chief actor, and herein set forth by Homer B. Hulbert. New York: The Century Company, 1903. 12mo.; pp. 315. Price, $2.

Mr. Vanderlip, engaged by a Russian firm to make an extended prospecting tour in Kamchatka, meets with a series of experiences and adventures that, as recounted by Mr. Hulbert, make delightful reading. Doubtless in the actual experience there were thrills that were not altogether of delight. To have yourself and your sledge run away with by the pack of fourteen dogs, to be buried in a blizzard and to spend five days in a snow dugout, to fight millions of mosquitoes on the banks of the Paran River—these escapades, mildly exciting to read, must have been anything but blissful in the living.

WIRELESS TELEGRAPHY: ITS THEORY AND PRACTICE. By William Maver, Jr., ex-Electrician of the Baltimore and Ohio Telegraph Company; Member of the American Institute of Electrical Engineers. New York: Maver Publishing Company, 1904. 8vo.; pp. 216; 123 illustrations. Price, $2.

This book was begun several years ago as an appendix to the author's "American Telegraphy and Encyclopedia of the Telegraph;" but the rapid progress of the art of wireless telegraphy made Mr. Maver decide to publish it as a separate volume. The book follows, as far as practicable, the general lines of the former work. Each subject has been treated both from a theoretical and practical standpoint, in language as free as possible from formulæ, and which is intelligible to the general reader. The descriptions of systems and apparatus has been limited almost entirely to those in active operation, but any operating devices of note which have escaped the attention of the author, owing to the rapid advancement of the art, he expects to describe in a later edition. The book gives a comprehensive statement of all that appertains to wireless telegraphy as at present developed, and it forms a complete practical handbook.

REPORT OF THE ELEVENTH MEETING OF THE SOCIETY FOR THE PROMOTION OF ENGINEERING EDUCATION. Edited by Calvin M. Woodward, C. Frank Allen, and Clarence A. Waldo. New York: Engineering News Publishing Company, 1903. 8vo.; pp. 379. Price, $2.50.

This volume contains the addresses given at the Eleventh Annual Meeting of the Society, which was held in joint session with the American Institute of Electrical Engineers, the first three days of July, 1903, at Niagara Falls, N. Y. Among the important papers contained in the book is the last from the pen of the late Prof. Robert H. Thurston, of Cornell University, on "Educational Values and our Modern Liberality in Education." The book also contains a valuable report by a committee upon technical books for public libraries. Some twenty other papers on engineering, electrical, and technical subjects are contained within its pages, which are bound in a neat blue cloth cover. The index to the first ten volumes, as well as any of these volumes, can be had of the publishers at reduced prices for libraries throughout the country.

PRINCIPLES OF AMERICAN FORESTRY. By Samuel B. Green. New York: John Wiley & Sons. London: Chapman & Hall, Limited, 1903. 12mo.; pp. 334. Price, $1.50.

The author is Professor of Horticulture and Forestry, University of Minnesota, and a member of the Forest Reserve Board of the State of Minnesota. His intention has been to furnish information of an elementary and basic character for the student and the general reader. "The Tree," "The Forest," "Forest Influences," "Propagation," "Nursery Practice," "Forest Protection," and "Forest Problems," are some chapter headings indicative of the nature and scope of the work. A tabular classification, a glossary, and a detailed index complete the volume.

REMINISCENCES OF GENERAL HERMAN HAUPT. Written by Himself. New York: John R. Anderson Company, 1901. 8vo.; pp. 331. Price, $1.75.

This is an autograph edition, each copy being numbered, and signed by the talented author. We use the adjective advisedly. Gen. Haupt has made his influence felt in many branches of activity; as a designer and builder of bridges; as a constructor of railroads and tunnels; as an inventor; as a military strategist and civil counselor; as a railway manager; as a manufacturer. Hence the wide appeal of these reminiscences. As Chief of the Bureau of United States Military Railways in the civil war, his personal interviews with the President and with the generals in command of the armies in the field gave him the opportunity of acquiring inside knowledge, and of forming opinions as to the great movements of the war. These views are set forth in a clear and convincing manner.

THE NEIGHBOR. The Natural History of Human Contacts. By N. S. Shaler. Boston and New York: Houghton, Mifflin & Co., 1904. 12mo.; pp. 342. Price, $1.40 net.

The author of "The Individual" and "The Interpretation of Nature" here gives us conclusions arrived at after careful, conscientious study of facts and conditions which we are accustomed to dispose of in the term "race prejudices." Our attitude toward the Jew and the Negro is analyzed, and serious consideration given the question of overcoming unwarranted bias with a view to accepting, in its completeness, the idea of the brotherhood of man, and thus of amalgamating those interests, at present antagonistic because viewed from various racial angles, which make up the commonwealth. These problems constitute a most important group, and Prof. Shaler's standing, and the scholarly work he has already done, entitle the statements and deductions of the present volume to a thoughtful hearing.

READY REFERENCE TABLES. Volume I. By Carl Hering, M.E. New York: John Wiley & Sons. London: Chapman & Hall, Limited, 1904. 16mo.; pp. 196. Price, $2.50.

These are tables designed for the use of the engineer, the physicist, the student, and the merchant, with conversion factors of every unit or measure in use. The calculations are based on the accurate legal standard values of the United States. The system of tabulation is somewhat novel and ingenious; instead of the usual rather cumbersome arrangement, all interconvertible units are found together, placed in the order of their size.

IRRIGATION ENGINEERING. By Herbert M. Wilson, C.E. New York: John Wiley & Sons. London: Chapman & Hall, Limited, 1903. 8vo.; pp. 573; 41 full-page plates and 139 figures. Price, $4.

In view of the reclamation law enacted by Congress, whereby two and a half millions of dollars are annually to be devoted to "public works other than those for river and harbor improvement," the subject of irrigation assumes increased importance to the engineering profession. The work before us is a fourth edition, revised and brought up to date, treating in a thorough manner of the various laws of hydrography, and of the usages in canal works and in storage reservoirs.

DESCRIPTIVE CHEMISTRY. By Lyman C. Newell, Ph.D. Boston: D. C. Heath & Co., 1903. 12mo.; pp. 590. Price, $1.20.

The volume is divided into two parts. The first comprises a description of the elements and their important compounds; the application of chemistry to well-known industries; the newer processes involving electricity; the theory of chemistry; tables and bibliography. The second part contains experiments; one hundred and fifty are given, requiring only inexpensive apparatus. The aim has been to produce a textbook that shall be more complete, better balanced, more serviceable to the student, and more helpful to the teacher, than any other available. It comes to us highly commended by several of the leading college professors of chemistry.

MICROSCOPIC ANALYSIS OF METALS. By Floris Osmond, C.E., Paris. Edited by J. E. Stead, F.R.S., F.I.C., Middlesbrough. London: Charles Griffin & Co., Limited. Philadelphia: J. B. Lippincott Company, 1904. 12mo.; pp. 178; with 100 photographic illustrations and two folding diagrams. Price, $2.50.

Two papers of Monsieur Osmond's are here published, the first under the title of "Metallography as a Method of Assay," the second dealing with "Micrographic Analysis of Carbon Steels." Not only has this well-known investigator authorized the publication of the English translation, but he has written for it a description of his microphotographic apparatus and the method of using it, which appears as an appendix to the volume. The chief value of this work on metallography lies in the positive accuracy of the experimental observations. One may disagree with some of the hypothetical conclusions, although they have yet to be disproved; but their truth or falsity does not affect the observations and experiments on which they were based; these have been repeated time and again with unvarying results, and are now universally accepted as a part of metallographic knowledge.

CYANIDING GOLD AND SILVER ORES. A Practical Treatise on the Cyanide Process. By H. Forbes Julian and Edgar Smart. London: Charles Griffin & Co., Limited. Philadelphia: J. B. Lippincott Company, 1904. 8vo.; pp. 405; with numerous illustrations and folding plates. Price, $6.

Much information relating to the industry of cyaniding gold and silver ores has been published in periodicals of the day or read, in the form of papers, before various societies; but a great part of such information is, by reason of its ephemeral nature, practically inaccessible to the student and investigator. Here we have a good deal of this fragmentary research brought together in a systematic way, and the result is a work of reference that the practical worker will greatly appreciate. Engineers of indisputable ability and standing have furnished data relating to methods and to cost, and have in other ways helped to make the manual inclusive of all that has so far been accomplished in the industry.

USES OF ELECTRICITY ON SHIPBOARD. By J. W. Kellogg. New York: Marine Engineering, 1904. 12mo.; pp. 78. Price, $1.

This small volume gives just the information needed by yacht and launch owners who wish to make use of electricity for lighting, operating winches, etc., on board their vessels. The information it contains is thoroughly practical and deals with the selection and care of an engine and generator, methods of wiring, and complete installation of a plant. In the chapter by D. A. Richardson on electric lighting of launches is discussed the use of storage batteries for this purpose. This chapter also contains a diagram of the wiring of a launch. The book contains a number of illustrations of engines, dynamos, and switchboards, as well as a diagram showing the wiring of a small steamship.

A TEXTBOOK ON STATIC ELECTRICITY. By Hobart Mason, B.S., E.E. New York: McGraw Publishing Company, 1904. 12mo.; pp. 155. Price, $2.

The author was moved to the preparation of this textbook by the apparent lack of any adequate work of the kind. "The subject of Static Electricity," he says, "is touched on in the average 'Physics' or 'Natural Philosophy,' in a most gingerly fashion." In textbooks devoted to Electricity the subject seems to be almost entirely avoided. His material appears to be well arranged and free from ambiguity of statement, and progresses naturally from general phenomena to a consideration of high potential static generators.

A MANUAL OF MARINE ENGINEERING. Comprising the Design, Construction, and Working of Marine Machinery. By A. E. Seaton. With Numerous Tables and Illustrations reduced from Working Drawings. London: Charles Griffin & Co., Limited. New York: D. Van Nostrand Company, 1904. 8vo.; pp. 707. Price, $6.

We have had occasion to refer to this manual for information on several points not usually covered by books on marine engineering, and have in each instance found these points noted and disposed of in an able manner. The author was formerly lecturer to the Royal Naval College of Greenwich; the engines of the destroyer "Salmon," designed by him, are shown in one of the admirably clear plates distributed throughout the volume. Even a condensed table of contents would be too long to give here, but it would be hard to find any subject, in any way related to the main theme, that has been overlooked or excluded.

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