(10354) E. A. asks: During a rainstorm a click, and sometimes a very brief ring of a telephone bell is frequently audible, and is always coincident with a heavy stroke of lightning. It seems very evident that the click of the bell is due to the lightning being coincident with it, but how does the lightning cause the bell to click? A. The ringing of the telephone bell when a discharge of lightning occurs in its vicinity is explained by induction. The electric discharge affects the wire in the same manner as the discharge of a battery current through the wire would do. The magnet attracts the armature, and the bell rings. It is a frequent occurrence with both telegraph and telephone lines.

(10355) J. D. A. writes: On several occasions I have read in the answers to questions of your valuable paper, that lightning is due to atmospheric disturbances. I have also noticed that this theory is advanced in most of the electrical books that have come to my hands. Though it is undeniable that there must be some disturbance, yet such theory does not seem to me entirely satisfactory, for it is open to the question, What is the nature of such disturbance? I am of the opinion (and the more I study the subject the more I adhere to it) that lightning is caused by the heat thrown off in the sudden condensation of the water vapors suspended in the atmosphere; the condensation being caused by the atmospheric pressure, and taking place whenever said pressure becomes greater than the expansive force of said vapors. Is not this possible? I would like to know your opinion on this theory, either through the columns of your paper or otherwise. A. While the condensation of water vapor in the air may be concerned in the production of electrification of the water drops in the air, it is not easy to see how the pressure of the air can be any different from the pressure of the vapor of water in the same place in the air, unless the law of Newton is untrue, that action and reaction are equal. The production of a flash of lightning is not yet accounted for by any theory, and we shall have to wait for more knowledge than we have to explain this phenomenon.

(10356) C. R. McM. writes: I desire to maintain a heat of about 105 degs. to 110 degs. in a box containing about 8 cubic feet of air. Can I do it by sending a current from a small battery through wires? How many cells and what kind? How much wire and what kind? A. We cannot advise the heating of air by electricity if expense is an object. It will cost many times as much as an oil lamp, and be as difficult of regulation as that. It can be done, however, by a coil of No. 14 or No. 16 iron wire with three or four cells of battery. The bichromate cell will give the heat quickest. The Edison-Lelande cell also may be used. It will work slower and last longer. A bichromate cell will need to be renewed every day. The length of wire should be perhaps fifty feet. We cannot give definite figures, since there are so many circumstances to affect the result. If you get too much heat reduce the battery, if too little add more cells.

NEW BOOKS, ETC.

CONSUMPTION AND CIVILIZATION. By Dr. John Bessner Huber, New York. Philadelphia: J. B. Lippincott Company. Profusely illustrated. 536 pages; large 8vo. Cloth, $3 net.

In this book of over 500 pages Dr. Huber has produced a masterly and exhaustive treatise on the subject of Consumption. Every phase of the disease—including cause, prevention, and cure—is described in such an interesting and instructive manner that it cannot fail to prove attractive to physicians, invalids, and all persons who are interested in the prevention and cure of this disease, which is the cause of one-seventh of all deaths which occur in this and many other countries. Over 130 fine engravings are used to illustrate sanitariums, cottage and tent life, and many other subjects. Invalids and others will find much in this book which will assist them in the work of restoring their health.

PRODUCER GAS. By J. Emerson Dowson and A. T. Larter. London: Longmans, Green & Co., 1906. 8vo.; pp. 295. Cloth. Price, $3.

Within the last three decades the subject of producer gas and its application has come to take a most important position in engineering science. The authors of this book have been closely associated with the development of producer gas during all these years, and are exceptionally well qualified to produce a work of this kind. The subject is treated briefly and concisely, and the illustrations excellently supplement the text. The recognized position of producer gas in practical work to-day is such that it promises to be extended very widely in the near future. This being the case, mere rule of thumb is no longer applicable, and the subject must be considered theoretically as well as practically. While there are numerous books on the theory and practice of the gas engine, there is probably no complete work available at present on producer gas alone, and for this reason the volume in question is an acceptable addition to the literature of the subject.

THE CHEMISTRY OF HAT MANUFACTURING. By Watson Smith, F.C.S. London: Scott, Greenwood & Son, 1906. 12mo.; pp. 124. Cloth. Price, $3.

Mr. Shonk has very ably revised and placed before the public Mr. Watson Smith's interesting series of lectures on the Chemistry of Hat Manufacturing. These lectures were delivered before the Manufacturers' Association in the years 1887 and 1888, and notwithstanding that a considerable period has elapsed since their inception, they have had such influence in the remarkable progress of the British hat industry that their republication at the present time was desirable. The book should be of great value to those interested in work of this character, on account of its thorough and excellent treatment of the subject.

THE SCIENCE YEAR BOOK. By Major B. F. S. Baden-Powell. London: King, Sell & Olding, Ltd., 1907. Price, $2.

This year there are but few changes in the Science Year Book, and few were necessary, as those familiar with this excellent work will understand. Of course, the usual revision, necessary because of changes in conditions during the past twelve months, has been made, and the summaries of science have been combined in one general article—an arrangement which is probably more convenient than the prior one of separate headings. Those requiring a diary of large size, combined with a scientific summary, almanac, etc., should not fail to obtain a copy of the present volume.

MODERN PRACTICAL CARPENTRY. By George W. Ellis. New York: Industrial Publication Company, 1906. 4to.; pp. 390. Cloth. Price, $5.

This is probably one of the most ambitious books which has ever been written about carpentry. The ground is covered in as thorough a manner as is possible within the limits of one book, and the text is accompanied by nearly eleven hundred excellent engravings, which clearly illustrate the subject matter discussed. The book is intended for the use of workmen, builders, architects, and engineers, and describes methods of constructing and erecting roofs, floors, partitions, scaffolding, shoring, centering, stands, stages, coffer dams, foundations, bridges, gates, tunnels, excavations, and gives various structural details. It furthermore includes the necessary calculations in carpentry, and simple methods for finding the bevels in roofs and the similar problems encountered. The treatise upon timber, notes on the woods used in carpentry, and the tables and a glossary of terms and phrases connected with carpentry will be found extremely valuable. The chapter on the uses of the steel square is exceptionally good.

INVENTORS AT WORK. By George Iles. New York: Doubleday, Page & Co., 1906. pp. 503. Price, $2.75 by mail.

"Inventors at Work" is one of the most interesting and meritorious books of this character which it has been our pleasure to review for a long time. Mr. Iles has been most successful in his compilation of important inventions and the work of the foremost inventors, who have been of service in the advancement of civilization. The book is well illustrated, and is arranged in subdivisions covering various classes of inventions and innovations in different industries. It should prove of the greatest interest to the layman as well as the scientist and the inventor.

A GRAIN CHART. By R. G. Becker. Pittsburg. Price, $2.

This chart exhibits in an interesting and forceful manner various statistics concerning the grain production of the world, which will be found of value by all those interested in the subject. It includes the production of grains, including wheat, barley, rye, oats, and corn in the United States up to 1906; the wheat crop by States, the world's wheat crop, average yields per acre in the United States, Russia, Germany, Austria-Hungary, France, and the United Kingdom, and various other interesting statistics.

REINFORCED CONCRETE. By Albert W. Buel, C.E., and Charles S. Hill. New York: The Engineering News Publishing Company, 1906. 8vo.; pp. 499. Cloth. Price, $5.

The American practice and the prevailing conditions governing the subject in question are followed in this treatise, which is intended primarily for designing and constructing engineers. The first edition of this excellent book has made it familiar to many interested in this phase of engineering industry, and it needs little recommendation in this column. The second edition includes, in the appendices, tests of beams and columns made by Prof. Talbot, of the University of Illinois, and by the United States government at the Watertown Arsenal. Much of this valuable matter has not as yet been widely circulated, and its addition to the contents of the book will unquestionably enhance the value to its readers. The authors of this work are among the leading exponents of the American practice.

ALTERNATING CURRENT MOTORS. By A. S. McAllister, Ph.D. New York: McGraw Publishing Company, 1906. 8vo.; pp. 278. Cloth. Price, $3.

Dr. McAllister's excellent work on the alternating current motor is not intended for the beginner in electrical science. It has been assumed that the reader is familiar with the fundamental facts of electricity and magnetism, and that he has some knowledge of the lower branches of mathematics. The author deals freely with graphical diagrams and the examination of facts upon which they are based. The mathematical treatment of the subject is limited as far as possible throughout. The diagrammatical illustrations are very good.

GOLD MINING MACHINERY. By W. H. Tinney. New York: D. Van Nostrand Company, 1906. 8vo.; pp. 308. Cloth. Price, $5.

As the title indicates, this work deals exclusively with the principal features of the machines employed in gold mining; their sizes, capacities, speeds, and the rules and formulæ governing their use. The descriptions are brief and concise, but still sufficient to describe fully the machinery in question. The notes on methods of erection and other matters will be of practical assistance to mining and mechanical engineers. This work will be found a practical handbook for use by practical men.

TEXT-BOOK ON THE STRENGTH OF MATERIALS. By S. E. Slocum, B.E., and E. L. Hancock, M.S. Boston: Ginn & Co. 8vo.; pp. 314. Cloth. Price, $2.25.

While this book is thoroughly representative of the best modern theory and practice, it is sufficiently elementary in nature to be available for student use in technical and engineering schools. The text has been so prepared that the student's knowledge of the subject shall be accurate as well as practical, thus reducing the liabilities of errors from an incomplete conception of the foundations upon which the subject is based. Each important point is illustrated by practical applications. Graphical methods are used for calculating centers of gravity and moment of inertia, and the moment of inertia is defined as the shape factor in the mechanics of materials. Other important features are the use of the core section, application of the principle of least work, comparison of column formulas, with graphical illustrations of their relation, and accurate formulas for the torsion of shafts of various cross sections.

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