

BOOK-REVIEWS.

A Handbook of Engine and Boiler Trials, and of the Indicator and Prony Brake. By R. H. THURSTON. New York, Wiley. 8°. \$5.

THIS work, being virtually the first of its kind, must of necessity fill an important place in the literature of the steam-engine; and the fact that Professor Thurston is the author is sufficient guaranty that it may safely be accepted as a standard of reference while present methods of steam-engine and boiler tests are in vogue. Engineers making tests of this kind have hitherto been compelled to do so without any definite standard of reference; and no generally accepted criterion has been available for the engineer who wished to record the results of engine or boiler trials in an acceptable and permanent manner. The long-existing want of such a criterion has led to a general concurrence among engineers that a system, provisional though it may be, is feasible, according to which both engines and steam-generators may be satisfactorily tested. This system, which is based upon the work of a committee of the American Society of Mechanical Engineers, of their brother engineers in Germany, and of other recognized experts and authorities, is admirably presented in Professor Thurston's work.

This treatise presents, in a concise though clear and easily understood form, those methods of trial of heat-engines which have become standard; exhibits the processes of their application; describes the best forms of apparatus in current use in conducting the trials and in securing the data sought; and illustrates the uses and capabilities of these apparatus. It also presents examples of the reports made by distinguished engineers on important work of this character, and thus gives good examples of the form of such reports, and of the data and results deduced from them in the case of the better classes of machinery and apparatus.

The system of boiler trial described in this work is that proposed by the committee of the American Society of Mechanical Engineers, since become standard in this country, and to a great extent abroad. It is complete and satisfactory, having been found sufficient, so far, to meet every ordinary requirement.

A chapter is devoted to the steam-engine indicator, giving a brief and simple account of that instrument and its capabilities, as well as a description of the usual and best ways of handling it, though no attempt has been made to elaborate to any great extent the study of the diagram. Many forms of diagram, however, are illustrated, and the student is referred to special treatises on the indicator for further information on the subject. A description of the methods usually considered best and most exact in the measurement and computation of the indicator diagram is given in a separate chapter, as well as of the processes leading to the more important of the results attainable by the use of the instrument.

A series of valuable reports, written by able engineers as models of data summaries and of conclusions derived from such summaries, add to the completeness of the work. One example in each of the more important classes of steam-engine is studied in this manner, and any engineer, by a study of the series, should be enabled to secure satisfactory results in making tests, even though previously inexperienced in such work. An appendix contains all needful constants and reference-tables, and an abundance of illustrations adds much to the clearness and value of the text.

The Origin of the Aryans. By ISAAC TAYLOR. (Contemporary Science Series). New York, Scribner. 12°. \$1.25.

THIS is an able and interesting book, the object of which is to give the latest results of the controversy concerning the origin of the Aryan races. It opens with a chapter on the history of the subject, beginning with the assumption of the philologists that the original home of the undivided Aryans was in Central Asia, whence the various branches of the common family migrated to their present seats. This assumption is easily shown to be baseless, and the old theory has now been abandoned by the majority of archæologists. Moreover, it is

now generally held that the greater portion of the population in the countries we now call Aryan really belongs to other families of mankind, and that the widespread prevalence of the Aryan languages is due to conquest by Aryan peoples. The evidence of this is mainly anthropological, and its presentation occupies a considerable portion of Mr. Taylor's book. He repeats the various arguments that have been adduced to prove that the original home of the Aryans was in Europe, which he regards as conclusive. But the question then arises as to which of the prehistoric races of Europe is to be regarded as the original Aryan stock. On so difficult and so unsettled a question we shall not here offer any opinion, but will briefly indicate the evidence and the arguments that have thus far been adduced.

The skulls and other remains of the neolithic age point pretty clearly to the fact that at that time the greater part of Europe was peopled by four distinct races,—the Iberians in Spain, Britain, and some other places; the Ligurians in central France; the Celto-Slavic race in central Europe; and the Teutons, or Scandinavians, in the north. Of these, the Iberians seem to be related to the Hamites, and the Ligurians to the Turanian family; so that, if the original home of the Aryans was in Europe, the original Aryan race must be either the Teutonic or the Celto-Slavic. Here, therefore, is now the main point of contention, the German writers generally upholding the claims of the Teutons, and the French those of the Celts. The dispute has been conducted with considerable acrimony and with a rather unseemly exhibition of national feeling on both sides, and is still unsettled. Mr. Taylor inclines in favor of the Celts, but maintains a judicial attitude, and avoids a decisive expression of opinion. He presents the evidence on the whole subject, however, at considerable length, and the clearness of his style makes it intelligible to the reader. Those who wish to know the latest views and arguments on the question will find his book useful.

Laboratory Manual of Experimental Physics. By ALBERT L. AREY. Syracuse, Bardeen. 24°. 75 cents.

THE author of this book is a civil engineer by profession, and at present is instructor in physics at the Rochester Free Academy. The aim of the book is to describe such experiments as will lead to quantitative work on the part of the student, and the author lays considerable stress on the importance of bringing home to the students the existence of a personal error in observations, that within limits can be much reduced by using intelligence and care. All simply illustrative experiments are omitted from the book, the author believing, with most teachers in this field, that such can be carried out to the best purpose on the lecture-table.

It is needless to say that the experiments described can be performed with apparatus of the simplest kind, most of it capable of being home-made. Many of them are new, and are sure to be suggestive to those engaged in teaching of this character.

Whether we approve of the alternate blank pages intended for notes supplementing the text, we can hardly say; yet that these notes will be well entered by some is very true, and for such the benefit of forming a habit of noting down points brought out at the time of experimenting will be considerable.

Fort Ancient. By WARREN K. MOOREHEAD. Cincinnati, Robert Clarke & Co. \$2.

MR. MOOREHEAD and a competent staff of assistants spent the season of 1889 in making a careful survey of Fort Ancient, the renowned earthwork of Ohio. The results of his investigations have been published in the present volume, which is most beautifully illustrated with excellent photo-engravings, which greatly enhance its value. From his extended researches the author draws the following inferences: Fort Ancient is a defensive earthwork, used at times as a refuge by some large tribe of Indians, and at times there was a large village situated within its walls. The fields within the wall, especially in the enclosure of the old fort, are covered with pottery fragments, bones, arrow-heads, and flint chips. The ground has many

burnt stones below the surface. There are traces of villages in the country surrounding the fort. The author expresses his conviction that the fort possesses nothing of a religious nature.

A pavement which has been found inside may have been used as a place for the war-dances or councils of the tribes assembled in the fort. The author believes that these tribes were in advance of the Shawnees, the Delawares, and others who occupied the territory in 1787. But they did not know the art of smelting, though they used hammered copper and galena. In concluding, the author calls attention to the similarity of the arts of the Mandans and the tribes who inhabited Fort Ancient, and expresses the opinion that they may have been the builders of the works. The book proves to be the result of a very careful and detailed investigation, for which ethnologists will be thankful to the author, even should his theories not find general acceptance. The endeavor, which appears throughout the book, to represent the finds and the methods in which they have been obtained as clearly as possible, which is supported by the excellent illustrations accompanying the descriptions, gives the work value aside from all theoretical considerations.

Railroad Engineers' Field-Book and Explorers' Guide. By H. C. GODWIN. New York, Wiley. 16°.

To the many railroad engineers who do not consider themselves expert mathematicians this field-book will prove of exceptional value. It contains, in small compass, every thing that can reasonably be sought for in a book of the kind, intended solely for use in the field; leaving those things which pertain to extreme accuracy, and which may be rarely needed, for a supplementary or complementary volume, which may be assigned a place with the camp equipage. The idea which prompted the preparation of the volume is good, and we think it has been well worked out. The author has avoided as much as possible the intricacies of mathematics, and at the same time has produced a work of more general application than might have been expected by engineers familiar with books of its kind.

The book is divided into four principal parts, the first dealing with railroad location, the second with railroad construction, the third with reconnaissance and exploratory surveys. The fourth is devoted to general information of a miscellaneous but no less useful nature. To these are added an appendix and a set of tables. The book is well adapted to the use of railroad engineers engaged on location and construction work, as well as to the use of the explorer in making exploratory surveys.

AMONG THE PUBLISHERS.

READERS of all classes, young and old, will be glad to know that the Scribners are issuing a new book by Mrs. Frances Hodgson Burnett. It will be entitled "Little Saint Elizabeth, and Other Stories," and is an attractive picture of child-nature.

— The second volume of Donald G. Mitchell's latest work, "English Lands, Letters, etc.," will soon be published by the Scribners. It will contain the author's talks about historical and literary England from the time of Elizabeth to Queen Anne, Shakspeare being the first, and Swift the last, personage of importance who passes under review.

— A timely article is "Stanley's Emin Pasha Expedition" in *Lippincott's* for April. A concise biographical account of Emin Pasha is given, and also the reason of Stanley's expedition, with other information.

— Mr. Marston, of the London publishing-house of Sampson Low, Marston, & Co., wrote recently from Cairo, where he was in company with Mr. Henry M. Stanley, "Mr. Stanley is devoting absolutely the whole of his time, from early in the morning (sometimes as early as 6 o'clock) till late at night, in writing his great book. I have read a good part of the text, and I think I may say, without being accused of puffing, that it is profoundly interesting. I am happy to add that Mr. Stanley was well pleased to learn from me that I had completed satisfactory arrangements for si-

multaneous publication in France by Messrs. Hachette & Co., in America by Messrs. Scribner's Sons, in Germany by Mr. Brockhaus, in Spain by Espasa & Co., in Italy by Messrs. Treves, and in Scandinavia by Mr. Mallings."

— There is an article on "Egypt at Home," by Rev. Dr. W. C. Winslow, vice-president of the Egypt Exploration Fund, in the April number of the *New England Magazine*. It is an account of the Egyptian collection in the Boston Museum of Fine Arts, the most important Egyptian collection in America, and is illustrated. The number will also contain a full page portrait of Miss Edwards, from a recent photograph by Sarony, with an article upon her work by Mrs. Sallie Joy White, and several facsimiles of passages from her letters and manuscripts.

— To Shakspeare students the plan and scope of Dr. Furness's "Variorum Shakspeare" are known, as are the pains, judgment, and critical faculty expended upon them. Each play as it appears brings into one focus all the wealth of a great Shakspearian library, so arranged as to be immediately accessible. "As You Like It," the eighth volume of this splendid edition, will be published by J. B. Lippincott Company on April 25. The volumes previously issued are "Romeo and Juliet," "Hamlet" (two volumes), "Macbeth," "King Lear," "Othello," and "The Merchant of Venice."

— The publishers of the *Electrical World* have secured the services of Dr. Louis Bell, who will in future have editorial control of that enterprising journal. T. C. Martin and Joseph Wetzler, who have heretofore edited the *Electrical World*, have taken editorial charge of the *Electrical Engineer*, and that well-known paper will henceforth appear as a weekly.

— Civil-service reform has a champion in Mr. Oliver T. Morton, who, in a paper called "Some Popular Objections to Civil-Service Reform," which appears in the *Atlantic* for April, is not afraid to say that the spoils system "is at war with equality, freedom, justice, and a wise economy, and is already a doomed thing fighting extinction. Its establishment was in no sense a popular revolution, but was the work of a self-willed man of stubborn and tyrannical nature, who had enemies to punish and debts to pay." This certainly strikes no uncertain note. The article is divided into sections, each one of which is headed by a paragraph which embodies some objection to the movement.

— The April issue of the *Quarterly Journal of Economics*, published for Harvard University, will contain articles by President Francis A. Walker on "Protection and Protectionism," in which arguments for and against protection are temperately discussed; by Professor Taussig of Harvard, on the "Silver Situation, its History and its Dangers;" E. C. Gonner of Liverpool, Eng., on "Ricardo and his Critics;" F. B. Hawley of New York, on "Profits and the Residual Theory;" N. Matthews, jun., of Boston, on the "Taxation of Mortgages in Massachusetts." There will also be notes and memoranda on the law against socialists in Germany, on recent works on finance and political economy, and the usual bibliography.

— Of the contents of *Outing* for April, we note "Signaling for Antelope on the Staked Plains," by William H. Johnston, jun.; "Wheel and Camera in Normandy," by J. W. Fosdick; "Melton Mowbray; or, Fox Hunting in the Shires," by "Merlin;" "Some Defects in Tennis," by D. C. Robertson; "Tennis Scores," by William Strunk, jun.; "Bowling for Women," by Margaret Bissland; and "Yacht Racing in Great Britain," by F. C. Sumichrast.

— The wide-felt interest in the present discussion of the revision of the Westminster Confession of Faith has manifested itself in a steadily increasing demand for the recent publications relating to the subject. The Scribners have brought out a third edition of Dr. Briggs's "Whither?" and the pamphlets entitled "Biblical History," and "Whither? O, Whither?" by Dr. McCosh; also a new edition of Dr. Schaff's "Creed Revision," with an appendix containing a report of the discussion in the Presbytery of New York. The same publishers are issuing a new contribution to the subject by Dr. Shedd, entitled "The Proposed Revision of the Westminster Standards."