cited. "Heat a few pieces of zinc with a strong solution of sodium hydroxide. What gas escapes? What is there in the solution? From your previous experience, what acids will dissolve zinc?" Or again, "To 1 c.c. of silver nitrate solution add a little ammonium chloride solution, and then a solution of some of the salt made above [sodium thiosulphate]. Describe the phenomena, and explain, using equations."

It is obvious that each of these experiments opens up a large subject, and will necessitate reference to a descriptive text-book, and probably to a demonstrator as well. This is, of course, eminently desirable, and there can be little doubt that Dr. Hillyer's book, if properly used, will prove a helpful laboratory manual. It ranges over inorganic chemistry, and the selection of experiments has been carefully directed to bring out the most important facts and principles.

L'Industrie des Matières Colorantes Azoïques. Par George F. Jaubert. Pp. 167. (Paris: Gauthier-Villars.)

IT is over forty years since the late Dr. Peter Griess placed at the disposal of chemists a reaction which has since proved of such importance, both scientifically and technically, that a large literature is now in existence dealing with the class of compounds known as azo- and diazo-compounds. From the industrial side, the most important development has been the manufacture of a group of colouring-matters which are now turned out on a colossal scale, and which are so numerous in individual members, that in the last edition of the "Tabellarische Übersicht" of Schultz and Julius (1897) no less than two hundred and seventy-three distinct technical products of this class were catalogued. The present little work is one of the useful "Aide-Mémoire" series from the "Encyclopédie Scientifique," published under the direction of M. Léauté of the Institute. It is fairly brought down to date, and contains in a handy and portable form a tabular list of the colouring-matters in question, including also the nitro- and azoxy-compounds which find place in technology. The little volume will be found valuable by all engaged in this department of chemical industry. R. M.

Elementary Practical Mathematics. By Frank Castle, M.I.M.E. Pp. x + 401. (London: Macmillan and Co., Ltd., 1899.)

IN this book the student is carried rapidly through a course of arithmetic, algebra, geometry and trigonometry to some of the simpler problems of mensuration and dynamics. The idea is to bring the desk and paper work of the pupil into closer touch than heretofore with the work of the shop or factory—in other words, to indicate from the very beginning the practical value of mathematical methods.

The purely academic theorem or problem is to be "taboo," or, in the words of the preface, "abstract reasoning is to be relegated to the background, and concrete facts are to form the basis of the student's work." The principle is probably a sound one, but it may be carried too far; and experience alone will decide as to the efficiency of the system embodied in Mr. Castle's book. The student, if not otherwise instructed, will find certain parts very hard to follow. Thus on p. 341, in the discussion on maxima and minima, a differential coefficient is suddenly introduced without a word of explanation or apology. The great brevity, which the limits of the book impose on many of the sections, will also be a serious barrier to their ready intelligibility. As a general rule, the explanations and descriptions are clear and accurate; but we have noticed two statements which, if not absolutely incorrect, are, at any rate, misleading. On p. 23 we read that "the invariable interval of time between two consecutive southings of a star is divided into 24 equal parts, each called an hour." True, but this is not the hour as usually understood and *practically* used; yet there is nothing in the context to indicate the distinction between the sidereal and mean solar hour. The other doubtful statement is on p. 290, where we read: "Any change in the direction or speed of a moving body is produced by force. When a force acts in either of these ways it is said to do work." The "direction of a moving body" is a curious truncated phrase; but the implication that a force always does work when it alters the direction of motion of a moving body is still more curious. Here truly are sinks of waste of solar energy that were never dreamed of in the philosophy of Helmholtz and Kelvin! These blemishes apart, however, there is much to commend in the book. Contracted arithmetical operations are strongly insisted upon. The chapters on logarithms, the slide-rule, orthographic projection and graphical methods, are particularly deserving of praise. The book is beautifully printed, the illustrations are clear and well conceived, and the examples—both in the text and in the exercises—are all of a distinctly practical character.

The New Education. Manual Training: Woodwork. By Richard Wake. Pp. viii + 360. (London: Chapman and Hall, Ltd., 1899.)

MANUAL training, or instruction in the use of tools, may be made of great educational value if care is taken to develop the rational and constructive faculties rather than to produce dexterity in tool manipulation. The author of this volume deals with the subject upon the right lines, and the course described by him will encourage pupils to measure accurately, observe minutely, and work with close attention to details—all of which are desirable attributes to cultivate. A special feature of the course is the effort made to develop the creative faculty in children by inducing them to design for themselves the simple models to be constructed in wood. No attempt is made to describe woodwork of the ornamental character which is often seen in school workshops; each exercise has a purpose, and that purpose is to educate.

The book covers the requirements in manual training for Standards V., VI. and VII. of public elementary schools. It is well illustrated with working drawings and reproductions from photographs showing pupils performing the various operations of woodwork. Teachers of the subject will find the volume helpful and suggestive.

The Naval Pioneers of Australia. By Louis Becke and Walter Jeffery. With illustrations. Pp. xii + 314. (London: John Murray, 1899.)

THIS is a pleasant and accurate compilation for popular reading, based largely on the authoritative documents now being published by the Government of New South Wales. It is, in fact, a short history of the connection of the British navy with Australia. The standpoint is that of political rather than natural history; but many references are made to the large interest taken by Sir Joseph Banks in the beginnings of Australian colonisation. The problems of the first discovery of Australia are scarcely touched on, and the book is in no sense concerned with controversial questions.

Arithmetical Exercises in Chemistry. By Leonard Dobbin, Ph.D. Third Edition. Pp. vi + 52. (Edinburgh: James Thin, 1899.)

PROF. CRUM BROWN, who contributes a preface to this book, points out that it contains clear descriptions of "the principles involved in the calculations required in dealing with chemical changes, and such physical changes as are of special importance to junior students of chemistry." The exercises should be of value in fixing ideas in the minds of students and illustrating the operations of arithmetical chemistry. The ability to make such simple calculations as are here given is essential to a clear understanding of the laws of chemistry.