Calcul numérique. Par R. DE MONTESSUS et R. D'ADHÉMAR. Paris, O. Doin et Fils, 1911. 246 pp.

THIS work is in two parts.

The first part (pages 3–138) is by R. de Montessus and is entitled Opérations arithmétiques et algébriques. Its principal content is in the three chapters devoted to the calculation of the roots of numerical algebraic equations and of transcendental equations. For the resolution of these problems a rich variety of methods is given. Many of these are elementary and are usually found in texts on the theory of equations; but others of them are less generally employed. As examples of the latter are those (in Chapter V) in which the calculus of differences is employed for numerical approximations. The methods given are illustrated with many numerical exercises. This part contains a very convenient and readable account of its subject matter.

The second part (pages 141–237) is by R. d'Adhémar and is entitled Intégration. It is concerned primarily with quadratures and differential equations, but contains a short digression on implicit functions and equations, the latter being treated by the method of successive approximations. The author has attempted only an introduction to his subject; this is desirable and is indeed all that could be done in the short space employed.

R. D. CARMICHAEL.

Elementary Theory of Equations. By L. E. DICKSON. New York, John Wiley and Sons, 1914. v + 184 pp.

IT is a good omen for the development of mathematics in this country when some of our most brilliant men of research are willing to take the time to prepare elementary texts suited to the needs of beginners. It is therefore a pleasure to welcome this excellent book, by Professor Dickson, on the elementary theory of equations.

Naturally, no treatment of the difficult Galois theory is given. On the subject of invariants one finds merely a few illustrative examples and no systematic exposition. These omissions will probably be approved by every one who desires to use the book in his classes. The remaining and more elementary aspects of the theory of equations are developed with sufficient fulness to meet the needs of all teachers who are likely to employ such a book for purposes of instruction.

Certain sections, with a total of about fifty pages, are marked with a dagger; the remaining sections form an independent whole and provide a briefer treatment for those who desire such a course.

A large number of illustrative problems are solved in the text, and about five hundred others are given as exercises. These are carefully selected and graded and are distributed in such a way as to be convenient for purposes of instruction. They are so placed that a reasonably brief and elegant solution may usually be expected.

Interspersed throughout the text is a considerable number of brief and clear statements which will serve to give the student an outlook upon various topics of decided intrinsic and historical interest.

In Chapter I (pages 1–17) is given a treatment of the scientific art of graphing. By its aid one may make better graphs in less time than otherwise and at the same time draw negative conclusions so as to sense more than he sees.

Chapter II (pages 18–30) contains a satisfying introduction to complex numbers together with an excellent and concrete discussion of the roots of unity. Chapters III (pages 31–37) and IV (pages 38–46) are given to a treatment of the solution of cubic and quartic equations respectively.

An exposition of the first proof by Gauss of the fundamental theorem of algebra is contained in Chapter V (pages 47–54), while Chapters VI (pages 55–62) and VII (pages 63–80) are given respectively to elementary theorems on and symmetric functions of the roots of an equation.

Chapter VIII (pages 81–92) contains a treatment of reciprocal equations, construction of regular polygons, duplication of cubes, and trisection of angles. It is shown that the second last and in general the last constructions are not possible with ruler and compass. Likewise the impossibility of such a construction for a regular polygon of 7 or of 9 sides is proved by a method applicable to the general case of non-constructible regular polygons.

Chapter IX (pages 93–108) is devoted to the problem of isolating the real roots of an equation with real coefficients. In view of the errors which are often found in the statements and proofs of the theorems of Descartes and Sturm and Budan, it is refreshing to find them here treated in a satisfying manner.

In Chapter X (pages 109–126) on the solution of numerical equations emphasis is put upon the method of Newton on account of its several advantages; but an appropriate treatment is also given of other methods.

Chapter XI (pages 127–149), which is independent of the earlier chapters, contains an easy introduction to determinants and their application to the solution of systems of linear equations.

Finally, Chapter XII (pages 150–166) is devoted to the theory of resultants and discriminants.

The reviewer believes that this book will be found highly satisfactory and that it will have wide use.

R. D. CARMICHAEL.

The Teaching of Geometry. By DAVID EUGENE SMITH. Ginn and Company, 1911. v + 339 pp.

THE Teaching of Geometry is a good book. It is "worth the paper it is printed on," which can not be said of some books and it is worth a great deal more, which can be said of comparatively few books. The preface puts the reader in the spirit of the text immediately. The table of contents tells as completely as one page can what is contained in the three hundred and thirty. The first chapter contains a discussion of "questions at issue" in mathematical pedagogy. The reader is given both opportunity and encouragement to range himself on one side or other of these questions, but not without an understanding of what they mean. The next five chapters include some reasons for studying geometry, a brief history of the development of the subject giving necessarily much prominence to Euclid's part in this development and to efforts at improving or modifying his treatment of the subject. The remainder of the book takes up some of the details of classroom work, but no cut and dried rules are given. The author's own words describe the spirit of this text quite excellently: "Get a subject that is worth teaching and then make every minute of it interesting." J. V. MCKELVEY.

A History of Japanese Mathematics. By DAVID EUGENE SMITH and YOSHIO MIKAMI. Chicago, The Open Court Publishing Company, 1914. v + 288 pp.

THE history of Japanese mathematics as given by Smith and Mikami seems to furnish a parallel in some respects to