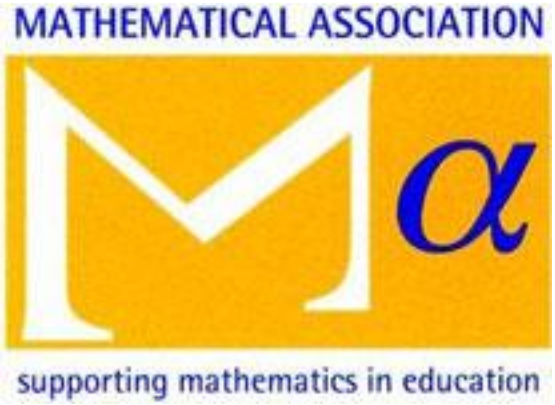

nearly 700 tall pages in the French edition are not full of interesting matter. Lieutenant Freund of the French Navy is responsible for those in the first volume, which take us up to Descartes and Huygens. Those in the second are by M. Montessus, and may be readily recognised by the asterisks in the text. The essays added to the first volume are as follows:—On Vieta as a geometer, a passage extracted from Chasles' *Histoire de la Géométrie*; an original analysis of the works of Napier relating to logarithms (28 pp.) by M. Biot; 5 pages on Kepler, taken from M. Bertrand's *Fondateurs de l'Astronomie*; The work of Galileo and Huygens, translated from Mach; and the preface of Duhem's *Origines de la statique*. Of these, the most interesting is the monograph by M. Biot. As it opens "Ayant été chargé il y a quelques mois. . . ." one might be led to suppose it is the work of recent investigation. But, at a guess, it is abstracted from Biot's *Mémoires Scientifiques*, consisting of his articles to the *Journal des Savants*. If this be so it is the only one of these notes that will not be found in the average mathematical library of any pretensions, the four large volumes being extremely rare and worth about £4 10s. The dates of the articles vary from 1830-1906. Nearly thirty pages on Vol. II. are given to M. Darboux's fine St. Louis lecture on *The Development of Geometrical Methods*. This is already within reach of English readers, being translated in the *Gazette* at the time, and afterwards in *Science*. We would have preferred some less accessible matter, such as, for example, Cantor's second Congress lecture on the *Historiography of Mathematics*, Hilbert's *Future Problems of Mathematics*, Poincaré's *Intuition and Logic in Mathematics*, or the like. The four pages of *errata* by no means exhaust those we have noticed, especially in English words, from Trinity "Collyge" to Sir "Olivier" Lodge. But we must not grumble. There is a good deal of additional matter in Vol. II., bringing the later portion of the history up to date. To those who are interested in the study of the history of mathematics we may cordially recommend the notices of this edition which have been appearing for some time past in the *Revue des Questions Scientifiques*, a Belgian journal of great merit. They are from the accomplished pen of the Père B. Lefebvre, S.J., and are marked by great erudition. We would suggest to M. Hermann that they should be reprinted as an addition to Vol. II. in the second edition. Though, as we say, they have been going on for some time, they so far have only reached the period of the Arabs.

An Elementary Treatise on the Differential Calculus founded on the Method of Rates. By W. W. JOHNSON. Pp. 191. 1908. (Wiley & Sons.)

Professor Johnson's *Treatise* has so recently been reviewed in these columns that there is no need to do more than call attention to the publication of an abridgment of the larger work, the main differences being in the earlier portions of the subject. The principal formulae of differentiation are established by more direct methods than the functional method in the *Treatise*. There are plenty of examples and yet not too many, which is an advantage to the private student who has no one to tell him that the existence of a set of fifty or sixty examples at the end of a chapter does not at all imply that they must be worked through before passing on to the next.

Lehrbuch der Differential- und Integralrechnung. By J. A. SERRET. Third edition, revised and enlarged by G. Scheffers. Vol. I. Pp. xvi, 624. (Teubner.)

Serret's *Cours de Calcul Différentiel et Intégral* still seems to hold its own in the land of its birth and in Germany. It was published some thirty-five years ago, and Harnack's translation into German was issued in 1884. A second edition was published in 1904 by Bohlmann and Zermelo, and it concluded with about *four and a half pages of errata*. The last French edition came out in 1900 (it is time for another), and now we have a third German edition prepared by G. Scheffers. The book is transformed. One lamentable feature in its predecessors was the inferiority of the figures, and, what is unusual, the inaccuracy of many of them. These have disappeared; all the figures are new, and their number is increased. Typographical devices make the book much easier to read and to find one's way about in. Many of the chapters are entirely re-written and all are brought up to date. For instance, the sections on number are remodelled in accordance with the modern doctrine. More space is devoted to maxima and minima, and there are a couple of sections dealing with the functional determinant, while the inde-

pendence of functions and equations receives attention. There is a good ten-page index, and we can cordially congratulate the editor on the result of his labours. Serret's work is at last fit to take its place among trustworthy text-books on the subject. We have not yet received the second volume, on the Integral, and the third volume, which is to deal with Differential Equations, is not yet out. We may *en passant* venture to remark that the student who wishes to acquire German for his own or for examination purposes has now plenty of opportunities of doing so. He can try this volume with the new French edition when it appears. For more advanced work he now has translations of Forsyth's *Differential Equations* and of Osgood's *Theory of Functions*. For Mechanics he may tackle Mach with the aid of the translation published by the Open Court Co., and so on. It is astonishing how rapidly anyone with the slightest aptitude for linguistics can in this way pick up a running acquaintance with what we may call "mathematical German."

A Sequel to Elementary Geometry, with numerous Examples. By J. W. RUSSELL. Pp. viii, 201. **Solutions to the Examples in A Sequel to Elementary Geometry.** (By the same hand.) Pp. 112. 1908. (Clarendon Press.)

Mr. Russell's volume, by its very title, challenges a reminiscent comparison with the late Dr. Casey's well-known *Sequel to Euclid*. School teachers will find it is very much better adapted for their purpose. Casey's volume contained a considerable amount of extraneous material, interesting enough in itself to a select few, but scarcely on the lines to be commended for youthful pursuit. To what one may call the leisured student it had its attractions, and Mr. Russell has, we think, done wisely in sweeping overboard almost the whole of what used to be called the "Recent Geometry of the Triangle." Indeed, the sections on this subject are confined to what is necessary to know w.r (to use his very acceptable abbreviation), isogonal lines and points, symmedians, antiparallels, and Brocard points. Let us say at once that in selection and arrangement of material the book bears the impress of the experienced teacher, and will be gladly welcomed by those who, while they want the irreducible minimum, yet want the phrase generously interpreted. The few analytical notes in the Appendix will be found useful. There is a plentiful supply of riders scattered throughout the different sections, and the book concludes with two carefully selected sets of "easy" and "harder" examples, in addition of course to those to be found at the end of each chapter. The value of the book is enhanced to many by the addition of a Key to all the Examples. Many of the solutions are models of the elegance we have a right to expect in such an acknowledged craftsman in the sphere of geometry as Mr. Russell has long shown himself to be.

The Physics of Earthquake Phenomena. By C. G. KNOTT. Pp. xii, 281. (Clarendon Press, Oxford.)

Dr. Knott's volume will be of interest both to the geologist and to the physicist, but portions of it will be as *caviare* to the general, unless they also happen to have some mathematics. The chapter on Seismometry contains an excellent discussion of the dynamics of the horizontal pendulum. We are not surprised that so shrewd a critic as Dr. Knott views with suspicion the use of harmonic analysis in the search for periodicities in a given body of statistics. His argument is as follows: Take a group of statistics of earthquakes for the months of the year. Measure on a horizontal line twelve regular intervals, and at the centre of each interval draw to scale a vertical line representing the corresponding frequency. This gives a rough graph showing the march of frequency with time during the year. With the aid of Fourier's theorem, we analyse this function into simple harmonic components, the periods of which are 1, $\frac{1}{2}$, $\frac{1}{3}$, $\frac{1}{4}$. The period of the first is one year, of the second six months, of the third four, and so on. This is "a purely mathematical operation enabling us *simply* to build up the original function by putting together the components again, or, if it has any physical significance at all, it is based implicitly on two very doubtful assumptions: (1) that the acting causes themselves are simple harmonic in their variation, and (2) that this simple harmonic quality is *dynamically reproducible* in the system acted upon. The whole theory of forced vibrations . . . shows