The value of the book as a reference work is enhanced by a number of Appendices such as a table of 423 integrals, a catalogue of mathematical symbols and abbreviations, arranged according to subject and, perhaps most important of all, French, German, Russian and Spanish vocabularies which enable the English-speaking reader to trace the definition of a foreign word. The first appendix is devoted to five-figure tables of logarithms and trigonometrical functions. This section also contains, surprisingly enough, tables of the present value of an annuity of one dollar per year for n years.

The main value of the volume lies, however, in the dictionary itself and there is no doubt that it will prove a valuable addition to any library of mathematical books. The authors have accomplished a very difficult task with great credit and it would be unfair to complain that a few entries might have been better presented since the vast majority of the definitions appear entirely satisfactory to the reviewer. The mathematical topics covered range from school mathematics to topology, abstract algebra, analytical dynamics, statistics, numerical analysis, the theory of games and business mathematics. To suggest how comprehensive is the coverage, we mention that the subheadings for the word *complete* are as follows: *complete annuity*, *complete field*, *complete induction*, *complete scale*, *complete space*, *topologically complete*, *complete set of functions*, *complete systems of representations for a group*, *weakly complete space*.

The volume is handsomely printed, bound and priced. D. E. RUTHERFORD

SMITH, D. E., *History of Mathematics* (Dover Publications, Inc., New York, 1958). Vol. I, xxii+570 pp.; vol. II, viii+703 pp. $2.75 each volume.

SCOTT, J. F., *A History of Mathematics* (Taylor & Francis Ltd., London, 1958), x+260 pp., 63s.

The two volumes of Professor D. E. Smith's *History of Mathematics*, written, as the preface tells us, " to provide teachers and students with a usable textbook of elementary mathematics ", originally appeared in 1923 and 1925. Now that the value to the specialist student of some knowledge of the development of his subject in its wider aspects has gained general recognition, and courses of lectures in the history of science and its special disciplines are being instituted in various universities, the present reprint of Professor Smith's book is most opportune. Of course the reader who turns to the section headed " Modern calculating machines " in the expectation of finding an up-to-the-minute account of this vast and growing field will be disappointed; but with this one exception there is nothing in the reprint that strikes one as out of date.

The historian of science, especially of mathematics, has to hold the balance between his presentation of the development of abstract ideas on one hand, and on the other of those national and personal aspects, often of great significance, without which the record would be lacking in human interest. This problem of presentation has been solved in different ways. Thus Cantor, Klein and others have skilfully contrived to interweave the two aspects in a unified treatment. Professor Smith's solution is the unusual one of writing two volumes from different standpoints. In the first volume the growth of mathematical knowledge is summarised by chronological periods, the emphasis being on individual mathematicians and their background, with not much more than a brief mention of their contributions to mathematics. In the second volume the development from the earliest times of some important topics in elementary mathematics (arithmetic, algebra, geometry, trigonometry and calculus) is traced, the emphasis being now on the mathematical ideas and their relationships. This dual method of presentation produces less overlapping than might have been expected; the two volumes complement each other perfectly, and either can be read independently of the other.

A notable and highly constructive feature of the work is the list of about a score of " Topics for discussion ", with which each chapter closes. Any reader who conscientiously sets out to investigate, for example, " Fermat's contributions to the calculus compared with those of Cavalieri, Barrow and Roberval " or " The mathematics of England in the 14th century; in what ways did the science meet the needs of the time? " will soon find himself reading both widely and deeply, guided by the bibliography and the excellent footnotes with which the text is liberally provided. The appeal of the work is greatly enhanced by the large number of illustrations which are included in the text, mainly portraits, maps and reproductions of text or diagrams from early manuscripts or printed books.

This remarkable and eminently " usable " work is written with a refreshing gusto and a continual awareness of the many points at which mathematics touches human life. The author, never weighed down by his wide erudition, has succeeded admirably in communicating to the reader something of his own enthusiasm for a fascinating subject. The paper and printing are excellent, and the binding, sewn sections in a shiny plastic cover of somewhat flamboyant colour and design, is durable and serviceable, a necessity for volumes each well over an inch in thickness.

By comparison, Dr J. F. Scott's book is on more sober and conventional lines, both outwardly and inwardly. Dr Scott has already written books on Wallis and Descartes (which he modestly omits from his bibliography) and has now given us a history of the whole subject from antiquity to the beginning of the nineteenth century. Although the work is planned on a smaller scale than Professor Smith's, it covers rather more than elementary mathematics, and manages to pack a surprising amount of detailed information into its pages. The book is more self-contained; there are fewer footnotes, and they do not range so widely. Two useful appendices are included, the first containing short biographical notes on many of the mathematicians whose work has been referred to, and the second briefly summarising some fifteen topics mentioned in the last four chapters of the book, such as Complex Numbers, Complex Variable, Descriptive Geometry, Elliptic Integrals and Functions, Invariance, Isoperimetry, Least Action and so on. There is also a bibliography of source material containing about seventy items.

The book is admirably written, and is scholarly and accurate in detail. Only trifling errors have been noted; on p. 41 Nicomachus should be Nicomedes, and on p. 237 Colin Maclaurin is said to have died at York, instead of Edinburgh, a mistake which Professor Smith has also made. On p. 168 it is implied that James Gregory's independent discovery of the binomial theorem took place some three or four years after the date (1676) of Newton's Epistola Posterior. Actually Gregory died in 1675. In the account of the binomial theorem one might question Dr Scott's interpretation of Newton's remark to the effect that after he had discovered the extraction of square roots *more arithmetico*, he entirely disregarded the interpolation of series, and employed these operations (*has operationes*) exclusively as a more genuine foundation. Dr Scott differs from other authorities, including Turnbull, in taking " *has operationes* " to refer to the binomial theorem.

But these are minor points; Dr Scott has written a most useful and eminently readable book, which can be studied with profit and enjoyment by students and teachers alike. R. SCHLAPP

RUTHERFORD, D. R., *Fluid Dynamics* (University Mathematical Texts Series, Oliver and Boyd, 1959), ix+226 pp., 10s. 6d.

This book, based upon lectures given by the author in the University of St Andrews, should prove extremely useful to students of mathematics as a first course of reading in fluid dynamics. The exposition is very clear, an essential feature when so much is put into a book of such limited size. There are chapters on basic concepts, on the