Our Bookshelf.

Dynamical Systems. By Prof. George D. Birkhoff. (American Mathematical Society Colloquium Publications, Vol. 9.) Pp. viii + 295. (New York: American Mathematical Society; Cambridge: Bowes and Bowes; Berlin: Hirschwaldsche Buchhandlung, 1927.) 3 dollars.

THIS book comes as a welcome addition to a noteworthy series of volumes—the American Mathematical Society Colloquium Publications—and it contains, with subsequent developments, the material presented in Prof. Birkhoff's Colloquium Lectures at Chicago in 1920.

The work is entirely formal and, while one would not regard it as a book from which to approach the study of theoretical dynamics, anyone who has read, say, Whittaker's "Analytical Dynamics", will not find it difficult. In the first two chapters the author introduces the types of Lagrangian systems in an original way, and discusses some special integrals of the equations. Moreover, instead of restricting himself to equations of Hamiltonian type, he takes the general Pfaffian equations, which have the advantage of retaining their form under an arbitrary point transformation instead of only under a contact transformation.

The third chapter deals with the normalisation of the equations and their general formal solution in the neighbourhood of an equilibrium point and with the case of 'generalised equilibrium', that is, motion about a periodic motion.

Chapter iv. deals with the question of the stability of periodic motions. An interesting result (pp. 115-121) is the connexion between reversibility and complete stability. The author shows that if there is stability of the first order, then reversibility is a necessary and sufficient condition for complete stability.

The remaining five chapters follow the lines of Poincaré's geometric methods, and are concerned with establishing the existence of periodic motions in the vicinity of a periodic motion of stable type. The methods employed are certainly very elegant, though, unfortunately (except in special cases), their application seems to be limited to systems with two degrees of freedom. The last chapter deals with the celebrated 'problem of three bodies'.

The errata, though numerous, are in no case serious, and are mostly of the type which the reader cannot fail to detect and correct for himself. The treatment is rigorous, and much of it is original, and altogether the volume forms a valuable addition to the literature of the subject.

Greek Thought and the Origins of the Scientific Spirit. By Prof. Léon Robin. Translated from the new revised and corrected French edition by M. R. Dobie. (The History of Civilisation Series.) Pp. xx + 409. (London: Kegan Paul and Co., Ltd.; New York: Alfred A. Knopf, 1928.) 21*s.* net.

WE have already had occasion to direct attention to the attempt which is being made, in this "History of Civilisation" series, to systematise, and to make more generally available, the vast amount of knowledge achieved by modern research in social studies. Prof. Robin's contribution to the series is entirely worthy of the occasion, and will probably rank as one of the finest. For immense erudition combined with perfect clarity of expression the book can have few equals. As M. Henri Berr, who writes a foreword, truly states, the treatment is marked by "discerning and cautious interpretation of doctrines", and "rigorous characterisation of systems and schools". These qualities are especially apparent in the interesting paragraphs which introduce and conclude the several chapters. Most suggestive, for example, is Prof. Robin's comparison between the immense and the living influence of Plato, in whose writings the greatest problems of thought are unravelled and prepared and established in their form for future speculation, and the more external influence of Aristotle, the form of whose writings lends itself so well to literal acceptance as an absolute authority. It was Aristotle whose influence for a long time turned science away from the paths of decisive progress. For the gift of elaboration and presentation is not the same thing as the very spirit of inquiry.

Thermochemie: Arbeitsmethoden und Analyse der thermochemischen Daten insbesondere in dem Gebiete der organischen Verbindungen. Von Prof. Dr. W. Swietoslawski. (Handbuch der allgemeinen Chemie, herausgegeben von Prof. Paul Walden und Prof. Carl Drucker, Band 7.) Pp. xi + 253. (Leipzig: Akademische Verlagsgesellschaft m.b.H., 1928.) 22 gold marks.

PROF. SWIETOSLAWSKI is a well-known authority on thermochemistry and is exceptionally well qualified to deal with "experimental methods and analysis of thermochemical data with special reference to organic compounds". The present volume is the seventh of a series, of which some earlier numbers have already been reviewed in these columns (Mar. 14, 1925, p. 374; Sept. 1, 1928, p. 308). Its three principal sections deal with the methods of calorimetry and of thermochemical measurements, analysis of thermochemical data, and thermochemistry of atomic linkages respectively.

The first two sections have a somewhat specialised technical interest, but the last covers a series of problems in which all chemists are directly interested, since every organic chemist would like to know the heat of formation of various bonds of a carbon compound, and every inorganic chemist would like to know the heat of formation of the ions of an electrolyte. The information which is now available is summarised in the last thirty pages of the book, which will be read with interest by many who have no direct interest in the experimental determination of thermochemical data.

Protozoology: a Manual for Medical Men. By John Gordon Thomson and Andrew Robertson. Pp. xiii + 376 + 4 plates. (London: Baillière, Tindall and Cox, 1929.) 30*s.* net.

THE preface of this book states very plainly that it is intended for medical men as distinct from research workers, and that on this account the arrangement