A First Course in Differential Equations

By Prof. Norman Miller. Pp. v + 148. (London : Oxford University Press, 1935.) 7s. 6d. net.

THE course developed in this interesting volume is intended for students who have taken a first course in calculus and, therefore, it assumes some familiarity with the relevant processes of algebra and analytical geometry. The subject-matter embraces the methods of solving equations of the first order, both of the first and higher degrees ; linear equations with constant and variable coefficients ; ordinary equations in more than two variables ; partial equations of the first and higher orders.

As a first course, no attempt has been made to deal with the purely theoretical side which would demand a greater knowledge of the theory of functions than is expected from a student who has only taken a first course in calculus. Indeed, the author has dealt with the subject in so skilful a manner that interest for further study is almost unconsciously stimulated. This is especially true in the treatment of partial equations.

The methods of solution are well illustrated both geometrically and by their application to practical problems. As a professor in a Canadian university, the author has followed the usual custom on the other side of the Atlantic by using the word *slope* in the same sense as the term *gradient* is used in Great Britain.

The book is well printed and may be thoroughly recommended as a reliable text-book for students beginning the very important study of differential equations.

Problems in Soil Microbiology

By D. Ward Cutler and Lettice M. Crump. (Rothamsted Monographs on Agricultural Science.) Pp. vii + 104. (London, New York and Toronto : Longmans, Green and Co., Ltd., 1935.) 9s. net.

ONE of the most characteristic features of the soil is the presence of a complex micro-flora and micro-fauna. The activities of this complex population are of the highest importance both for the philosophical and practical study of the soil, for there is scarcely a reaction or property of the soil which is unaffected by micro-biological processes. In the investigation of these processes, the Rothamsted workers have played a leading and distinguished part.

The present book is a series of studies in soil microbiology. Whilst it appeals to the specialist rather than to the elementary student, the general reader may gain from it an idea of the complexity of the processes in which the micro-organisms of the soil are concerned. The authors liken the problems of soil micro-biology to a tangled skein which can only be unravelled thread by thread. The realisation of this precludes any hope of a speedy solution. Yet here, as in other branches of pedology, patient and imaginative study is winning order from chaos.

As may be expected in one of the Rothamsted monographs, the subject matter is presented in a lucid and interesting manner. G. W. R.

Descriptive Mathematics

By John Maclean. Pp. xvi + 143. (Bombay, Calcutta, Madras and London : Macmillan and Co., Ltd., 1935.) 2.8 rupees.

IN this interesting book, the author, as a result of a search through many recent scientific papers, has collected the varied applications of the methods of elementary mathematics, which are employed in the description of quantitative phenomena. The form in which these are presented is based upon experience gained in teaching such methods. Whilst, however, the applications are drawn from a wide field, emphasis is laid rather on the method than upon its practical use.

The subjects dealt with include : the slide rule, Cartesian graphs, the angle as an independent variable, nomography, statistics, probability and finite differences. There are some valuable notes on calculation and upon the misuse of scales and contours. The text is amply illustrated by diagrams and charts dealing with such remote subjects as properties of blood, basal metabolic rate determinations, periods of art, etc., whilst a good glossary, index and bibliography are provided. Mathematical rigour is well-tempered by interesting descriptive matter, and the whole course aims at giving the student an insight into the methods of simple mathematical research.

Higher School Geometry

By L. Crosland. Pp. xiv + 322 + xx. (London : Macmillan and Co., Ltd., 1935.) 6s.

THE book is to be welcomed as meeting the need for a single text-book dealing with all branches of geometry required in a two-years' course for a Higher School Certificate. The first seven chapters contain an analytical treatment of straight lines, circles and conics. Then follow three chapters on the geometrical properties of parabolas, ellipses and hyperbolas, treated sometimes analytically and sometimes by pure geometry, including orthogonal projection. The remaining chapters deal with the pure geometry of triangles and circles, solid geometry of straight lines, planes and polyhedra, and with the mensuration of prisms, pyramids, cones and spheres.

Thermionic Emission

By T. J. Jones. (Methuen's Monographs on Physical Subjects.) Pp. viii + 108. (London : Methuen and Co., Ltd., 1936.) 3s. net.

THIS elementary account of thermionic emission, after a short historical introduction, gives a brief, but well-documented, discussion of the theory of electron emission, and proceeds to a description of atomic film emitters, oxide-coated emitters and the thermal emission of positive ions. The companion monograph by Prof. E. V. Appleton on "Thermionic Vacuum Tubes" deals with applications of thermionics, and the two volumes are, in a measure, complementary. A bibliography of about one hundred and fifty references rounds off a very useful monograph. A. F.