ELIEZER, C. J., *A Modern Textbook on Statics for Students of Applied Mathematics, Physics and Engineering* (Pergamon Press, Oxford, 1964), xii+295 pp., 30s. (Flexicover), 40s. (hard cover).

No one will dispute the claim made for this admirable work that it will be extremely useful to students of applied mathematics, physics and engineering in universities and technical colleges, and to students at scholarship level in applied mathematics in senior forms of schools. But that there should still be room for books—at least if they are as good as Professor Eliezer's—which as regards subject matter and treatment could have been written—matters of notation apart—a century ago is vaguely disturbing to the complacency of a reviewer who has himself been teaching precisely this material for something approaching half that time. In the teaching of pure mathematics at all levels syllabuses and methods of approach have been the subject of a great deal of discussion and experiment in recent years, but not nearly as much attention seems to have been devoted to the entirely comparable problems of applied mathematics teaching, which, as far as British universities are concerned, can scarcely be said to reflect the progress that is being made in the subject as a whole. This is not to deny that the student can derive considerable benefit from the discipline of solving even the more unrealistic " problems " of conventional applied mathematics courses; but it is at least open to question whether the kind of course that served an earlier generation of British mathematicians so well is still the most suitable under present-day conditions.

When these general misgivings have been expressed, it must be said that what Professor Eliezer has set out to do he has done outstandingly well. His exposition is everywhere clear, concise and readable. The ground covered is rather less than in Lamb's well-known *Statics* of 1912, and the level of treatment comparable, but more detailed. The topics dealt with are Composition of Forces (including 3-dimensional applications), Friction, Graphical Statics, Shearing Force and Bending Moment, Work, Energy and Stability, Strings and Chains, Elastic Beams. Well-chosen examples, both worked and for solution by the student, taken from recent examination papers of the Universities of Cambridge, Oxford and London, and from G.C.E. and Ceylon Civil Service examinations, greatly enhance the value of the book, which is attractively produced and moderately priced. It can be cordially recommended. R. SCHLAPP

LYUSTERNIK, L. A., *Shortest Paths—Variational Problems* (Popular Lectures in Mathematics, Pergamon Press, Oxford, 1964), x+102 pp., 17s. 6d.

This short book deals with a number of problems in the calculus of variations which are solved by entirely elementary methods. No knowledge of the calculus is required of the reader. The author states that the material was in the main presented to the secondary school mathematics circle at Moscow State University. The book can be strongly recommended for a school library and would form most useful additional reading for a sixth-form pupil.

After dealing with shortest paths on polyhedral surfaces, cylinders, cones and spheres the author introduces the idea of a geodesic on a surface in an elementary manner. The remainder of the book is devoted to problems connected with the potential energy of a stretched string, isoperimetric problems, Fermat's Principle, the brachistochrone problem and minimal surfaces of revolution. R. P. GILLESPIE

BOLTYANSKII, V. G., *Envelopes* (Popular Lectures in Mathematics, Pergamon Press, Oxford, 1964), ix+76 pp., 15s.

This booklet is an elementary introduction to the idea of the envelope of a system of plane curves. This idea is introduced by discussing how an envelope arises naturally in certain concrete problems, e.g. the " parabola of safety " in the theory of projectiles (Chapter I), the hyperbola which is the boundary of the zone of audibility of the sound of an aircraft flying at constant speed (Chapter II) and the astroid and cycloid which

appear in the problem of a rolling circle on a circle and a straight line (Chapter III). The final chapter contains the familiar treatment of families of curves and their envelopes. The exposition is lucid and there is a wealth of helpful diagrams.

R. P. GILLESPIE

VILENKIN, N. YA., *Successive Approximation* (Popular Lectures in Mathematics, Pergamon Press, Oxford, 1964), ix+70 pp., 15s.

The primary aim of this booklet is to present a number of methods for the approximate solution of equations. The author lectured on this subject to senior pupils at the school mathematics circle at Moscow State University and he has made use of the content of this lecture in the preparation of this book. The appearance of a book on this subject, which can be read by senior school pupils, is timely, since, increasingly, approximation methods are being introduced into the schools. Recent well-attended Symposia on the art of teaching approximations, held in London and Glasgow under the auspices of the Institute of Mathematics and its Applications, showed how widespread the interest is in this subject.

The book under review should prove useful, although it seems a pity that so much space is taken up with the introduction of the idea of a derivative, with which most of the potential readers of the book will be already familiar. R. P. GILLESPIE

EHRENFEUCHT, ANIELA, *The Cube Made Interesting* (Popular Lectures in Mathematics, Pergamon Press, Oxford, 1964), xii+83 pp., 21s.

This book is a translation of the original *Ciekawyszéscian*, published by the Polish Scientific Publishers in 1960, which was based on talks to teachers and school children. These talks were illustrated by the use of coloured models and in the book the place of these models is taken by a large number of " anaglyphs ", drawings in red and blue which have to be examined using spectacles in which one glass is blue and the other red. Such a pair of glasses is supplied with each copy of the book and when a drawing is examined through the glasses, one sees a solid model.

The book deals with planes of symmetry and axes of symmetry of the cube, the group of rotations of the cube, constructions made from coloured cubes and blocks that can be cut from a cube. The last chapter deals with the problem of sliding a cube of edge 31 in. through a cube of 30 in. In view of the introduction of the idea of a group into school mathematics, this book should provide interesting additional reading for senior pupils. While the anaglyphs are helpful, many readers will wish to construct models for themselves, as is suggested by the author in his preface.

R. P. GILLESPIE

ADAMSON, I. T., *Introduction to Field Theory* (Oliver and Boyd Ltd., Edinburgh, 1964), viii+180 pp., 12s. 6d.

This book is a most welcome addition to the University Mathematical Texts series. By careful selection of his material and a rigorous policy of cutting out all superfluous words, Dr Adamson has succeeded in his aim of bringing the reader from basic definitions to important and interesting results in the course of 174 pages. This should enable the reader to appreciate the richness of the subject and the elegance of its methods. Very little previous knowledge of abstract algebra is required but a reader with no experience of the subject will find that the close reasoning involved will make his progress appear slow if measured by the page and not the content.

The four chapters cover respectively: elementary definitions, extensions of fields and ways of classifying them, Galois theory of normal separable extensions of finite degree, and applications of the preceding theory including ruler-and-compasses constructions and solution by radicals. Careful attention has been paid to notation, including the use of bold type in some places and the book is carefully printed throughout. C. M. GLENNIE