SHORTER NOTICE.

Introduction to Analytical Mechanics. By ALEXANDER ZIWET and PETER FIELD. Macmillan and Company, New York. ix + 379 pp.

THE book is about of the size and character of Bowser's well-known text. It is based to a large extent on the senior author's Theoretical Mechanics, but the applications to engineering are omitted and the analytical treatment has been broadened. A general knowledge of differential and integral calculus and solid analytics is assumed; the reader is gradually introduced into the subject matter of differential equations and vector analysis but the authors have not deemed it wise to use the symbolic vector notation. The excellence of Professor Ziwet's texts is a matter of common knowledge and that before us is no exception. Likewise the publishers have maintained their established reputation as experts in the way of producing college and university text-books.

The contents of the work can be very well described by: Mechanics of a particle and of the solid body. These two parts have not been kept separate from each other; instead, they are spread out under the three headings of kinematics, statics, and kinetics, so that the reader who follows the text successively will at a rather early period of his study be introduced into the kinematics of the solid body. From a pedagogical standpoint this seems less desirable, since the reader is then generally not mature enough for this subject. Still experience with the book has shown that a teacher may well change the order of material to suit his own convictions.

In the mechanics of a particle the authors have given to part 1, Kinematics, a larger space than one would generally allot to it. There does not seem to be any cogent reason to list the material of pages 42 to 72 under Kinematics instead of Kinetics where it really belongs. Most likely this was done in the recognition that, for the introduction into the kinematics of the solid body, the reader's mind required a wider familiarity with mechanical problems. The examples are generally well chosen and sufficiently easy to make the student grasp the significance of the theory. They are decidedly

easier than some of those in Jeans' Theoretical Mechanics. A gradation between the two classes of problems should be effected by the introduction of illustrative examples which gradually increase in difficulty and to which hints are appended to lead the student to the right solution. We may never be able to attain the proverbial capacity of the English student for solving difficult problems, still we need not rest satisfied with being distanced by them as we are at present. The authors have in general refrained from giving references to standard works in mechanics. The only footnotes appear to be those on pages 256 and 258, the first of which refers to Professor Bôcher's Integral Equations, whilst the second calls attention to Professor Bolza's Calculus of Variations in Teubner's edition. It is difficult to see the good of these references in a text which is written for beginners. A much more appropriate reference would seem to have been Mach's Science of Mechanics or Pearson's Grammar of Science. The finished form of Kirchhoff's Mechanics appeals to us today less than it did thirty years ago, and even an elementary text should well take cognizance of the changed attitude towards the foundations of mechanics since Mach's fundamental contributions.

The mechanics of the solid body has received special attention and care from the authors. The geometrical discussion precedes the analytical treatment and prepares the way for a better understanding of this rather difficult subject. A short account of the fundamental concepts of vector analysis would have been most welcome. The introduction of the symbolic vector notation would have helped the understanding. The remarkable success of Föppl's texts on mechanics, which were originally written for engineering students, shows an advance in this direction which, a decade or two ago, could hardly have been expected. The derivation of Euler's equations and the presentation of the material leading to them are extremely clear and elegant. The authors might well have gone a step further in their presentation and introduced the reader to the concept of elliptic functions. There is hardly a better opportunity for this than in mechanics, since we are used to have the dependent variable in terms of the independent and not the reverse. The careless reader requires special attention to have this fact over and again pointed out to him. A graphic demonstration of the amplitude function is so easily

brought to the understanding of even a dull student that all elementary texts on mechanics presupposing the calculus should not omit this important finishing touch.

A small list of misprints which have come to the attention of the reviewer is herewith given.

P. 27, line 12 from below: omit index in v.
P. 37, line 5 from above: read acceleration times Δt.
P. 40, line 7 from below: read $r\ddot{\theta}$ instead of $r\theta$.
P. 44, line 3 from below: read $v_0 \sin(\epsilon t)$.
P. 56, line 3 from above: read $a(\cos\epsilon\cos\mu t + \sin\epsilon\sin\mu t)$.
P. 61, line 2 from above: read $= OP_x$.
P. 200, line 4 from above: read the potential is constant.
P. 256, line 6 from above: read $\sqrt{k/z}$.
P. 324, line 11 from below: factor dt left out on right side.
P. 361, Article 7, problem 7: 47 miles.
P. 373, Article 56, problem 7: first inside bracket is to be squared.
P. 373, Article 334, problem 7: 44° 34′.

KURT LAVES.

NOTES.

THE July number (volume 14, number 3) of the *Transactions of the American Mathematical Society* contains the following papers: "Proof of the finiteness of modular covariants," by L. E. DICKSON; "On transcendentally transcendental functions," by R. D. CARMICHAEL; "Sur les classes V normales," by M. FRÉCHET; "Implicit functions defined by equations with vanishing Jacobian," by G. R. CLEMENTS; "On the approximate representation of an indefinite integral and the degree of convergence of related Fourier's series," by D. JACKSON; "Certain continuous deformations of surfaces applicable to the quadrics," by L. P. EISENHART.

THE July number (volume 35, number 3) of the *American Journal of Mathematics* contains the following papers: "The primitive groups of class twelve," by W. A. MANNING; "The cartesian oval and the elliptic functions p and σ," by CLARA L. BACON; "The indices of permutations and the derivation therefrom of functions of a single variable associated with the permutations of any assemblage of objects," by P. A. MACMAHON; "Conjugate line congruences of the third order defined by a family of quadrics," by HELEN B. OWENS.