

any order. A good chapter on integration in series is brought in, though it might have been moved forward to let the chapter on systems of equations come closer to partial differential equations.

The book would have been improved, I think, by the addition of some easier examples. Those given work out very nicely but require some skill and accuracy in algebra. No misprints of any consequence were found save on page 15, Example 6,  $ay$  is put instead of  $dy$ . Many interesting little historical notes have been inserted and references have also been added freely.

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*Elements of the Kinematics of a Point and the Rational Mechanics of a Particle.* By G. O. JAMES. John Wiley and Sons, New York, 1905. xii + 171 pp.

ON page 102 of this excellent little book the author states its object in the following words: "It is my purpose here to develop in a rigorous manner the elementary theory of the motion of a *material point* or *particle*, and to thereby furnish a point of departure for the consideration of the motion of bodies as they actually occur in the material universe. This elementary exposition will then serve as an introduction to that portion of the subject which is known as *rational mechanics*, and in which the mathematical theory of the motion of portions of matter of *ideal* forms is investigated under *ideal* conditions, leaving the special applications to the particular sciences." The first eight chapters (pages 1-100) are devoted to the kinematics of a point and the last chapters IX to XVII to the mechanics of a free particle. It is not necessary to give in detail the contents of each chapter, some of which are extremely short; it will suffice to state the general structural lines along which the author has laid out the contents of the book. These lines are kept adroitly before the eyes of the reader, who is led straight to the goal and does not lose himself in the detail of side issues. The geometric derivative of a vector and its projection on an arbitrary axis is the fundamental concept upon which velocity and acceleration and their components depend. They are studied in detail both in rectilinear and curvilinear motion, where in each case proper distinction is made between absolute and relative motion; this is next extended to angular and axial motion, where again the same notions come into use which have been developed under linear motion. Here too the peri-