

turn the steps by which the solution of this problem is accomplished.

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Vorlesungen über technische Mechanik. Von AUGUST FÖPPL. Dritte Auflage. Bd. 1: *Einführung in die Mechanik*, xvi + 428 pp.; Bd. 3: *Festigkeitslehre*, xvi + 434 pp. Leipzig, B. G. Teubner, 1905.

THE valuable and highly popular work of Föppl on technical mechanics, which began its publication about ten years ago and rapidly ran into a second edition, is now appearing in a third edition of which the first and third volumes are already printed. The present plan calls for no serious changes in the text* other than an expansion into five volumes, the last of which is to contain a considerable amount of matter important for students of technical mechanics but somewhat more advanced than properly finds a place in the general fundamental lectures which fill the first four volumes.

The first or introductory volume still adheres closely to the original maxims of the author, namely, that mechanics is in reality a branch of physics and should be thus presented to beginners, and that no material should be inserted merely because some persons of special and restricted point of view might call for it. One of the most admirable features of the volume is its presentation of the elements of elasticity and hydro-mechanics in addition to the discussion of the mechanics of a particle and rigid body. It is probably true, and as such it is certainly regrettable, that the great majority of students leave the subject of mechanics after a course by no means meagre with the conviction that mechanics means merely the equilibrium and motion of a particle or rigid body. There is no great difficulty in giving even beginners a realizing sense of the fact that the subject is broader, that the general laws are equally applicable to the study of continuous distributions of matter. This, however, can only be accomplished by thorough adherence to the principle that mechanics is physics rather than mathematics and by a sacrifice of problems which involve complicated mathematical treatment. This the author does with great discretion. His students need not be experts at calculus and analytic geometry to be able to follow with

* An extended review of the four volumes as they appeared in the second edition was given in the BULLETIN, volume 9, pp. 25-35, 1902.

appreciation the treatment of questions taken up in the introductory volume.

Even in the third volume, which especially deals with elasticity, the analysis is kept in the background wherever possible, although toward the close where the subject of wave motion in elastic media is treated and considerable mathematical machinery becomes necessary there is no shrinking from mathematical complications. Such choice in analysis, setting it aside where it can well be done away and unhesitatingly introducing it where it becomes advisable, is one of the most valuable characteristics of the book — and the more valuable as it is so rare in the majority of books with which we are acquainted. Notwithstanding the introduction of some new material the size of the volume has been diminished by eighty pages. The reduction has been possible partly through the elimination of material that seems less vital, partly through the reservation of some subjects for the contemplated fifth volume. The appearance of this supplementary part of the whole work will be awaited with interest by all who are concerned with the question of the proper presentation of mechanics as a whole.

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Carl Friedrich Gauss Werke. Band VII. *Theoria Motus Corporum Cœlestium in Sectionibus Conicis Solem Ambientium.* Herausgegeben von der Königlichen Gesellschaft der Wissenschaften zu Göttingen. Leipzig, B. G. Teubner, 1906. Pp. 650.

It was within two or three years of a century ago that Gauss's famous *Theoria motus* first appeared. Now it comes out as the first 290 pages of the seventh volume of his complete works. The remaining 360 pages of the volume are made up of various notes and letters, in small type, which have been culled from the huge *Nachlass*. To rank all this matter as notes would, however, be extreme minimization; for there are two extensive investigations on the perturbations of Ceres and Pallas filling respectively 35 and 200 pages. Of these the latter for a long time seemed destined to receive the large prize offered by the French academy for a treatment of the perturbations of the asteroid Pallas; but like so much of the work of this *Princeps mathematicorum*, it never came to publication during his life, which lasted some twenty years after the investi-