

biography as a whole, we may quote from the remarks of Darboux when presenting the work to the Académie des Sciences: " Cette Notice nouvelle est composée avec le même soin, avec le même souci de l'exactitude et selon la même méthode que les Notices précédemment parues. . . . M. Ernest Lebon ne néglige pas de nous faire connaître la genèse des plus belles découvertes de Gabriel Lippmann. . . . Nous n'hésitons pas à prédire à cette nouvelle Notice le succès et la faveur qui ont accueilli les précédentes."

E. B. WILSON.

College Mathematics Notebook. By R. E. MORITZ. Boston, Ginn and Company.

College Engineering Notebook. By R. E. MORITZ. Boston, Ginn and Company.

Two notebooks, each $8\frac{1}{2} \times 10\frac{3}{4}$ inches, each of weight $1\frac{3}{4}$ pounds, in biflex binder with removable sheets, have been designed by R. E. Moritz and published by Ginn and Company. The first, for classes in advanced algebra, trigonometry, analytical geometry, and calculus, has 3 pages of simple formulas, 95 pages of rectangular coordinate paper ruled about 25 to the inch, 5 pages of polar coordinate paper ruled about $7\frac{1}{2}$ to the inch (radially), 2 pages containing seven 2-place tables, and one page of common graphs. The second, for classes in technical schools and colleges, contains 11 pages of simple mathematical and engineering formulas, the same outfit (apparently) of coordinate paper plus 5 pages of logarithmic paper, the same graphs, the same tables plus 4-place logarithms, 3-place natural functions, and a conversion table for circular measure.

For teachers who like to use notebooks of this type, these seem as elaborate as any. In so far as a notebook induces the student to greater system and neatness it is desirable. There are, however, undesirable features in a system of instruction which uses notebooks. For instance, in most work in mathematics a rough sketch of a curve is as good as a careful graph; using finely ruled paper generally leads the student to take the large amount of time necessary to construct a good graph or gives him too high an opinion of the accuracy of a hasty sketch; there are difficulties of the sort experienced in using 7-place tables on 3-place data; a coarser notebook might

be preferable. In so far as a reference table for formulas expedites a student's work, it is good; but if it leads him away from using the small amount of memory and common sense requisite for remembering most of the very simple and fundamental formulas here given, it is not good.

E. B. WILSON.

Gravitation. By FRANK HARRIS. London, Longmans, Green and Company, 1912. xi + 107 pp.

WHEN sending for this book, we hoped to find in it an account of past and present speculation concerning gravitation—especially in view of the recent active discussion under the lead of Einstein; we find, however, an independent theory of the hydrodynamic type with apparently no reference to the numerous prior authors who have tried to give a similar explanation of gravitational or electric phenomena. With picturesque language, guided by an entertaining philosophy, and frequently plodding through tedious approximations (the details of which we have not checked), the author discusses the mutual forces developed by two equal solid spheres moving in a perfect fluid with uniform velocity on the line joining their centers or in the line perpendicular thereto. A more general problem than this is far better treated by Lamb in his *Hydrodynamics* (arts. 97, 98, 136 of the second edition) with references to a fuller treatment.

Harris also treats sources and sinks and undertakes to make clear what is meant by the "cruelly ill-used" expression potential energy. In the last chapter of the work he argues for a higher dimensionality for space, accompanied by an extreme and progressive anisotropy in so far as the distribution of matter is concerned. Indeed our material universe now lies chiefly in the galactic plane, and is supposed to have become so completely three-dimensional that our sense of higher dimensions is atrophied (if it ever existed). These speculations may be interesting; but, unless supplied with more through analysis, they must be questioned.

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