

usual algebras there should be greater care. Thus, on page 38, line 4, ρ^2 should be replaced by ρ . On page 41, the sum of $a = (\alpha_1, \alpha_2)$ and $b = (\beta_1, \beta_2)$ is of course not $(\alpha_1 + \alpha_1, \beta_1 + \beta_2)$, but $(\alpha_1 + \alpha_2, \beta_1 + \beta_2)$.

Excessive brevity, especially toward the end, is hard on the reader. Equality of \mathfrak{A} vectors in an $\mathfrak{A}\mathfrak{B}\mathfrak{C}$ web (Vektorgleichheit) and in an $\mathfrak{A}\mathfrak{B}\mathfrak{D}$ web (Masszahl-*engleichheit*) do not mean the same thing, yet they are both called equality; this is especially confusing when, as on page 117, all four pencils are named. And, finally, it is to be hoped that the author will supply the next edition with an index and with an appendix containing all the axioms, to which reference must frequently be made.

Both books are excellently printed. Springer draws attention to his clear, neat page by a footnote on page 130 in contrasting type.

A good geometrical library will certainly wish to possess both works, the more so since they so surprisingly avoid duplication of subject matter. If a reader studies first the Hessenberg work, with its appeal to the pictorial sense, and then the sterner, very stimulating book of Reidemeister, he can gain greatly in his knowledge of the logic of geometry.

E. S. ALLEN

FOUR FRENCH BOOKS ON HYDRODYNAMICS

- (1). *Leçons sur la Hydrodynamique*. By H. Villat. Paris, Gauthier-Villars, 1929. iii + 296 pp.
- (2). *Leçons sur la Théorie des Tourbillons*. By H. Villat. Paris, Gauthier-Villars, 1930. ii + 300 pp.
- (3). *Mécanique des Fluides*. By H. Villat. Paris, Gauthier-Villars, 1930. vii + 175 pp.
- (4). *Leçons sur la Résistance des Fluides non Visqueux*. By P. Painlevé. Première partie rédigée par A. Metral. Paris, Gauthier-Villars, 1930. iv + 183 pp.

Within the last decade or two the interest in research in hydrodynamics has spread widely throughout all European countries, almost without exception, and very important progress is being achieved in various branches of theoretical and applied hydrodynamics. It is the more striking and disappointing that America has practically no share in this recent progress of hydrodynamics, at least as far as theory is concerned. The amount of papers on theoretical hydrodynamics published in this country is practically negligible. This is deplorable not only because of the high intrinsic interest and practical value of hydrodynamics, but also because in hydrodynamics we have an excellent field of application and means of sharpening of various mathematical tools. Suffice it to say that the recent progress of hydrodynamics mentioned above is intimately related to the modern developments of the theory of functions of a complex variable, conformal mapping, potential theory, integral and integro-differential equations and the like, being in many cases not only the after-effect but even the cause of the development. The last but not the least important aspect of hydrodynamics is the pedagogical one: there is perhaps no better way of illustrating abstract mathematical theories and of developing in students a critical ability in applying and interpreting mathematical results. It is to be hoped that the recent books published in Germany (by Oseen and Lichtenstein)