REVIEWS

Similitude Physique: Examples d'Applications à la Mécanique des Fluides. By ANDRÉ MARTINOT-LAGARDE. Paris: Gauthier-Villars, 1960. 70 pp. 14.00 N.F. or $3.00.

This little book deals with the notions of similarity and dimensional analysis. The first chapter gives a clear definition of the basic concepts of similarity conditions and similarity results in mechanics and physics, and states the fundamental theorem of Bridgman on the 'product of powers'. A very complete proof, which includes the case of discontinuous functions, may be found in an appendix. Chapters II and III are devoted to dimensional analysis; it starts with Vaschy's Theorem (or π theorem) which gives the key to the method. But, as everybody knows, some care is required, especially for physical constants which are not dimensionless, and for the arbitrary choice of the group of fundamental dimensions. The apparent paradoxes arising from these difficulties are explained with some interesting examples chosen from fluid mechanics. The author also shows in great detail how to apply this method in practice.

In Chapter IV, the author deals with the 'direct method'; in such a method all the equations and boundary conditions of the problem have to be written down and the task is to investigate how the relations may remain invariant by some change of scale. This method is explained with a few good examples which provide opportunities for some useful remarks. In particular, it is clearly shown that in many cases this last method may lead to the required result in an easier way than the apparently simpler method of dimensional analysis.

The danger with a monograph on this topic is that it may be either too long and too theoretical, or too short and too vague. In the reviewer's opinion, Professor Martinot-Lagarde has succeeded in writing a very convenient and useful book which is rigorous without using too many abstract concepts, and at the same time never loses contact with the physics.

P. GERMAIN