

*Lezioni sulla teoria moderna dell'integrazione.* By M. Picone and T. Viola. Edizioni Scientifiche Einaudi, 1952. 404 pp. 5000 lire.

The word "modern" in the title is to be taken with a grain of salt; the book could just as well have been written fifteen or twenty years ago. The notation and the point of view are old-fashioned; the exposition is verbose and occasionally vague. Integration, for instance, is defined in terms of limits on directed sets, but the definition of directed set is couched in the language of "variables" taking "well determined" numerical values. The bibliography contains no reference to Radon or to Nikodým. As a matter of fact, except for a half dozen references to relatively recent papers by Italian mathematicians, no reference is made to any part of the mathematical literature of the last fifteen years.

The material itself is essentially standard: it includes interval functions, Riemann-Stieltjes and Lebesgue-Stieltjes integration, Egoroff's theorem, theorems on term-by-term integration, the Riesz-Fischer theorem, Fubini's theorem, bounded variation in the sense of Vitali, integration by parts, absolute continuity, differentiation, and change of variables. All the sets considered are subsets of finite-dimensional Euclidean spaces. Since the authors took great care to make the proof rigorous, the book might be useful for a beginning student who is anxious to have all the epsilons spelled out for him.

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*Numerische Behandlung von Differentialgleichungen.* By L. Collatz. (Die Grundlehren der mathematischen Wissenschaften in Einzeldarstellungen mit besonderer Berücksichtigung der Anwendungsgebiete, vol. 40.) Berlin, Göttingen, Heidelberg, Springer, 1951. 13+458 pp., 1 plate. 45 DM; Bound, 48 DM.

Few are the books devoted exclusively to the numerical treatment of differential equations. One may recall Levy and Baggott in English, Panov in Russian, von Sanden in German and perhaps a few others—say Runge and Willers' Encyclopedia article. These are brief, limited in scope, handbooks rather than treatises. Here now is a more ambitious undertaking, namely to make a comprehensive study of numerical methods for both ordinary and partial differential equations. Of course such an ambition cannot be fully realized in a book of reasonable size, and inevitably some topics are touched only lightly. For example one notes that scant attention is given to those methods for ordinary equations which use open type quadrature formulas to predict and corresponding closed type formulas to cor-