off by a section on critical velocities. The other main topic, superconductivity, is covered in only about one third of the space devoted to liquid helium. Since this edition was written, several advances have been made which are very much in the spirit of this book: fluxoid quantization, the experiments to detect whether the unit carriers of the supercurrent are really pairs of electrons or higher multiples, and the work on high-field superconductors. It is very much to be hoped that a new edition will be brought out soon, incorporating this new material.

Superfluid Physics is intended as a text for first-year graduate students—primarily for those who do not intend to specialize in the subject but also as an introduction for those who do. It has therefore been written with the object of teaching students the physical principles behind every topic. Indeed as a teaching text it could hardly be bettered; it always leads gently from the relatively simple and familiar to the more abstruse. Above all, the writing is entertaining in a way that compels attention, and it manages to communicate some of the excitement of the gradual unfolding of the subject. It can be wholeheartedly recommended.

Ordinary Differential Equations. By L. S. Pontryagin. Transl. from Russian by Leonas Kacinskas and Walter B. Counts. 298 pp. Addison-Wesley Publishing Co., Inc., Reading, Mass., 1962. $7.50. *Reviewed by Dagmar Renate Henney, University of Maryland.*

IN many respects this is an excellent book. Being written by the world-renowned Russian topologist represents at the same time an advantage and also a disadvantage. The author is especially interested in problems which can be solved with the help of topological tools. The geometric treatment is given foremost consideration. Existence and stability of periodic solutions (the strength of the Russian school) are emphasized.

There is, in the opinion of this reviewer, not enough space devoted to the parts of differential equations which primarily concern the physicist. For example, bounded linear operators and problems dealing with the Sturm-Liouville theory have been treated only briefly.

Pontryagin's book compares favorably with the text on the same subject matter by S. Lefschetz. The Russian book is not as extensive, but somewhat easier to read.

The reviewer cannot go along with the publishers' claim that this text is designed for an introductory course. Without a thorough knowledge of advanced calculus, this book will be entirely incomprehensible (at least to the average American college student). The emphasis in the Pontryagin text is on applications of differential equations to the theory of oscillations and automatic control. It is not a "cook book", full of recipes on how to solve differential equations, but it is rather a modern, revolutionary book, designed to make the study of differential equations more interesting and attractive. The theory is developed for the most part in a remarkably beautiful way, which could only be ac-

complished by a "well-rounded" mathematician, who is equally well acquainted with many fields of theoretical and applied mathematics. As an example of the author's precision, the reader has only to observe how carefully each theorem is stated, even to the point of designating the domain of each function—a consideration, which is usually omitted in other books on differential equations.

Physicochemical Hydrodynamics. By Veniamin G. Levich. Transl. from Russian by Scripta Technica, Inc. 700 pp. Prentice-Hall, Inc., Englewood Cliffs, N. J., 1962. $20.00. *Reviewed by Stuart A. Rice, University of Chicago.*

ONE of the most neglected areas of research in physical chemistry in the United States concerns the interaction between hydrodynamic, thermal, and chemical processes. There are a few instances in which flow techniques have been used to extract fundamental information about chemical rate processes, e.g., Kistiakowsky's study of the diffusion flame for rapid reactions. In the volume under review, a brilliant exposition is presented of the relationship between chemical reactions and hydrodynamics. The treatment is clear, the physical reasoning incisive, and the analysis is often carried through to numerical results.

Not only is this work of great importance to the chemical engineer who must deal with problems of the nature considered every day, but it should also prove of great value to the practicing physical chemist who may find new methods of turning the analysis around and using flow processes to determine fundamental chemical parameters. The only complaint I have to make is that the type in which the equations are set is very small and occasionally difficult to read. I do not know whether or not it was photographed, but it appears to have been. This minor annoyance should not deter anyone from purchasing Levich's book, which I recommend without reservation to all physical chemists.

Physical Techniques in Biological Research. Vol. 4, Special Methods. William L. Nastuk, ed. 410 pp. Academic Press Inc., New York, 1962. $13.00. *Reviewed by Joseph G. Hoffman, University of Buffalo.*

ONE fundamental criterion for a book on techniques is the extent to which it spells out the myriad details of experimental laboratory procedures. It takes thousands of hours to learn the detail, and the probability runs small that it will be learned by the writer who will communicate it to others. An early classic methods text is *Procedures of Experimental Physics* by John Strong. A good description of how to deal with physical reality is as important as good theory. But unfortunately those descriptions require much verbiage.

It is pleasing to find that kind of extended discussion in some of the chapters of this book on "Special Methods", which is the fourth of a series of six volumes. It is seen in chapter 1 where Chien and Gregerson review body-fluid volume and in chapter 3 where Davies re-