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-

views the oxygen cathode. Chapter 4 by Fry and Dunn on ultrasound has considerable theory supplemented by photos and description of actualities. All six chapters of the book have various amounts of the detailed descriptive writing. The value of the treatise as a whole is enhanced by the accounting of minutiae of laboratory experience.

In very active areas of research, it may not be feasible to give detail. In that case, one enumerates the various methods, giving each a bold-face heading, a schematic diagram, two paragraphs, and the salient literature references. This method permits a listing of much general information, but it still refers the reader or student to the technical literature for a fuller picture. The text serves as a general critique and catalogue. One finds this method in Renkin's chapter on techniques of vascular perfusion, Margoshe's chapter on flame photometry, and in Otis's chapter on external respiration.

The purpose of the volume is well served by its excellent literature documentation, a generous number of diagrams, and graphs and tables. It is recommended to the worker in the life sciences particularly. The specialized material it presents is readily accessible because of its table of contents, author index, and subject index. Caution is advised about the symbols used: there are 3 lists of symbols: on page xiii, at the end of chapter 1, and at the end of chapter 6.

An Introduction to Infrared Spectroscopy. By Werner Brügel. Transl. from German by A. R. Katritzky and A. J. D. Katritzky. 419 pp. (Methuen, London) John Wiley and Sons, Inc., New York, 1962. $9.00. *Reviewed by T. H. Edwards, Michigan State University.*

WERNER BRÜGEL has written a remarkably good introduction to the many aspects of infrared spectroscopy. It appears to be the best introductory text currently available and is heartily recommended to all those interested in infrared spectroscopy. The no-nonsense, no-waste chapters on the fundamentals of the theory are especially to be commended because of his judicious choice and understandable presentation of the subject matter. The sections on equipment and on quantitative analysis are also good and relatively detailed. Other useful topics included are those of sample preparation, chemical constitution, qualitative analysis, and the spectra of large molecules. A large bibliography of over 800 papers and 20 texts is given: however, they are not quite up to date, in that most of the newer books on the subject are not mentioned at all. Weaknesses in this edition are headed by the use of spectra obtained nearly 30 years ago as examples of the high-resolution spectra of small molecules, and by statements that certain quantities and effects are not observed or are not important; whereas, what is really meant (I hope) is that the effects are usually small in magnitude. There are also a few errors or departures from standard notation, e.g., the definition of intensity (page 31), the use of photo-electric rather than photo-conductive (pages 134, 139), and the use of dispersion where scat-