with extensive first-hand experience in the creation, development and evaluation of measuring methods for gas-liquid flow and it reflects the personal touch of that experience. Even the best of the travel guides draw on the experience of others to present a well-rounded picture. When Harwell did not create, evaluate or improve on a measuring method, Hewitt draws on the encyclopedic collection of two phase flow literature in the Harwell files to tell you who did.

A brief introductory chapter comments on the physical nature of gas-liquid flow and discusses some models for characterizing momentum and heat transfer. The presentation seems intended to lay the framework for a wide variety of measurements discussed in the rest of the book. It is not particularly successful in doing so and a good place to start is in Chapter 2 which outlines a well reasoned classification scheme for the variety of experimental measurements used for gas-liquid systems. There are three broad groups:

- First order parameters; those of direct interest to the designer.
- Second order parameters; steady state measurements of interest to the researcher.
- Third order parameters; measurements which provide information on inherently unsteady or fluctuating quantities and where the character of the fluctuation is indicative of the process.

Measurement methods for steady first order (design) parameters which are discussed include pressure drop, heat and mass transfer coefficients, mean voids content and critical heat flux. For unsteady design parameter measurement, techniques are discussed for determining rapidly varying flow rates, void fractions, momentum flux and pressure, bubble growth and collapse rates, dryout and rewetting conditions. In addition, methods are presented for measuring less central design parameters such as vibration, stability and liquid level.

Perhaps, the most valuable contribution of the book rests in the presentation of the methods for measuring the second order parameters. These include flow pattern, film thickness, void fraction distribution, entrainment, drop and bubble sizes, wall shear stress and residence times. Here the direct experience of the Harwell laboratory adds a special level of authority to the presentation.

The chapter providing information on third order or fluctuating quantities is of only limited usefulness. Included are discussions of the time variation of film thickness, temperature, pressure, velocity, concentration and wall shear. Also briefly discussed are photographic methods for observing these variations. Modern methods for measuring fluctuating quantities (in the frequency range of 2-50 Hz which is of interest in two phase flow) are little different than those for steady flow. The significant difference comes in the methods for analyzing the time series. The presentation deals with this problem only superficially.

It is important to set the expectation for the reader correctly. This is not a manual of measurement methods with full detail. Rather, it is a guide which presents the methods and steers the reader to the location of the details which he needs. To this end there are included over 1200 references.

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Principles of Photochemistry, by J. A. Barltrop and J. D. Coyle, John Wiley and Sons: Chichester, New York, Brisbane and Toronto, 1979. (214 pages). $12.50.

As recently as twenty years ago, a review of a work that dealt exclusively with photochemistry might have seemed bizarre in these pages; attempts during the 1940s and 1950s to devise photochemically driven processes for the production of bulk chemicals had not been gaudy successes. In the meantime, photochemistry has matured startlingly, aided in no small measure by the invention of the laser which has created new horizons both for scientific and engineering studies and for the chemical industry. As a result the late 1970s find increasing numbers of chemical engineers using photochemical techniques, for example, in investigations of flames and of fuel combustion; in surface studies of catalysts; in attempts to understand and to increase biomass yields; and in campaigns to create new, solar-driven chemical syntheses.

When Baltrop and Coyle's 376 page monograph "Excited Studies in Organic Chemistry" appeared in 1975, it received a warm critical reception. The authors wrote in their preface that they hoped their work would serve both as a reference for practicing photochemists and an instructional text for undergraduate and postgraduate students. Given the price of that volume (now *ca.* $41), my guess is that students have not been rushing to the bookstalls for it. The present work is a different matter. Published in a quality, softbound version at about $13, it comprises the first six chapters of the original. These deal, in an exceptionally lucid manner, with the theoretical foundations of photochemistry.

Since adequate summaries of each of the six chapters have already appeared in reviews of the original version (cf. *Nature 260,* 735, 1976; *Science 193,* 670, 1976), they are eschewed here. Note, however, that this is not a "how to" manual although it does provide enough references to the experimental literature to permit a novice to begin laboratory work.

Missing from the present volume are the final five chapters of the original, which provide an uniquely organized and valuable review of the photochemistry of organic molecules. In their stead is a valuable set of problems with solutions to help students (or other photochemical neophytes) determine if they are mastering the material.

A familiarity with quantum chemistry at the level that now exists in many chemistry and chemical engineering undergraduate curricula would be helpful, if not essential, for anyone approaching photochemistry for the first time. The authors of this book, however, have performed a marvelous hat trick in producing a work from which both novice and expert may learn.

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Liquids and Their Properties: A Molecular and Macroscopic Treatise With Applications, by H. N. V. Temperley and D. H. Trevena, John Wiley & Sons, Inc., 1978, 274 pages; $37.50.

This book is a useful survey of liquids that combines molecular and macroscopic approaches. It is designed to be of use to students in the pure and applied sciences, and also to research workers in other fields who require a basic knowledge of the liquid phase. As is the case with other recent books on liquid state, this one seems to emphasize new insights into the structure and properties of liquids at the molecular level that have resulted from computer simulations, beginning about 1957, and the parallel developments in theory and experimental methods. It differs from other recent books in that it covers a wider variety of topics, including hydrodynamics, acoustics, liquids under tension, and other specialized or applied topics that are specialties of one or both authors.

Its most serious shortcoming is that it attempts to cover too many topics in too little space, with the result that many sections are so brief as to be of doubtful value. The section on solutions of gases in liquids, for example, consists of five sentences and includes no specific references for further reading.