

**LIQUID SCINTILLATION COUNTING—Recent Applications and Development. Vol. 1. Physical Aspects.** Chin-Tzu Peng, Donald L. Horrocks, Edward L. Alpen, Eds. New York, Academic Press, 1980, 414 pp, \$27.50

**LIQUID SCINTILLATION COUNTING—Vol. 2. Sample Preparations and Applications.** Chin-Tzu Peng, Donald L. Horrocks, Edward L. Alpen, Eds. New York, Academic Press, 1980, 538 pp, \$32.00

The widespread use of iodine-125 and solid crystal scintillation detectors in radioimmunoassay diminishes the usefulness of proceedings of a liquid scintillation symposium for most nuclear medicine physicians. The presence of liquid scintillation counters in many laboratories, the continued use of some tritium-labeled ligands, and the potential for wider applications suggest, however, that perusal of these volumes may be more interesting than it might initially seem.

This work contains the proceedings of the International Conference on Liquid Scintillation Counting, Recent Applications and Development, held in August 1979 at the University of California, San Francisco, and attended by scientists from various disciplines. It consists of 76 papers organized into fourteen sections in two volumes. With few exceptions each paper is preceded by an abstract or introduction and is well referenced. Each volume contains a brief, but generally helpful, index. For an undertaking of this magnitude, published so rapidly, the papers are remarkable for their readability and consistently good quality. These volumes are not primers nor are they intended to provide reviews of basic principles for the uninitiated. Rather, the intent is to examine the present status of liquid scintillation physics, instrumentation, sample preparation, and applications in a variety of scientific disciplines. Typically, most sections contain a summary paper followed by papers directed to specific problems, developments, or applications. These summary papers contain current information of interest to the widest group of potential readers. Those interested in specific problems will turn to more detailed literature, since the largest portion of this presentation will appeal to those with a general interest in and some knowledge of liquid scintillation counting (LSC).

Volume 1 contains eight sections beginning with historical notes and ending with a disappointingly brief discussion of waste disposal problems, which, unfortunately, offer few solutions. The section entitled "Scintillation Physics and Scintillators" contains only two papers of general interest to nuclear medicine physicians—"Liquid Scintillation Counting from Gross Counts to Spectral Analysis" and "The Application of Spectral Analysis in Liquid Scintillation Counting." Except for the intrusion of annoying commercialism, these papers, written by scientists from industry, describe beta spectral analysis and will be of interest to readers with counting instruments equipped to correct quench effects using "spectral indices." The section entitled "Quenching" begins with an excellent discussion defining the problems and reviewing possible approaches for quench detection and/or its correction. "Radioactivity Standards" reminds the reader that reliable standards are essential for calibration, efficiency measurements and quench correction, and instrument quality control. The approach to standardization taken by the National Bureau of Standards, the American National Standards Institute, and various commercial concerns are reviewed. The section, "Advances in Instrumentation," is notable in that although the major advances in basic liquid scintillation instrumentation during the past decade involve the development of microprocessor control and applications, most casual users remain ignorant of basic principles of liquid scintillation instrumentation. This problem is well summarized by Phillip E. Standley (Volume 1, p. 258) who writes:

"LSC is a commonly used analytical tool yet its complexity is generally not appreciated. It comes as no surprise, therefore, that users encounter disproportionate difficulties which are aggravated by their having little or no knowledge of the physical processes

involved. The matter is further complicated by the increasing tendency for manufacturers to make spectrometers that are easier and easier to use. The worker loads his samples, presses a few buttons and only has to return later to remove the printed output. With the neatly formatted results, he finds it difficult to believe that they may not be valid and it is only when he finds a totally unexpected result that his attention is turned to the use of the LSC technique and the problems therein. This situation has not changed since 1964."

Presumably, physicians will need little knowledge of techniques useful for alpha detection. The introductory paper in the section "Alpha Counting" may, however, be useful to groups associated with nuclear power facilities. "Cerenkov Counting" is a particularly interesting section and contains four well-written papers. The reader is reminded that higher energy beta particles can be quantitated using inexpensive scintillation media of suitable refractive index (e.g., phosphorus-32 in water) in a commercial liquid scintillation counter.

Because radioimmunoassay involves counting aqueous, solid, or inhomogeneous samples, considerations relevant to achieving an intimate association between the sample-containing radionuclide and the liquid scintillation solvent are of critical importance if this technique is to be successfully applied. Volume 2 devotes three sections to papers that address these problems. Those of greatest interest to physicians include the two introductory papers in the "Sample Preparation" section, and the majority of the papers in the "Emulsion (Solgel) Counting" section.

That chemiluminescence, considered an unwanted source of error by most of us, may be usefully applied is demonstrated in the section "Applications—Chemiluminescence and Bioluminescence." The fact that some immunoassays presently done by radioimmunoassay have been described using a luminescent label may make the excellently written introductory paper in this section of more than passing interest.

The section "Application—Environmental Monitoring" contains some interesting papers, e.g., "Determination of Natural Product Purity by Radiocarbon Measurement" and "Determination of the Origin and Age of Alcoholic Beverages by Liquid Scintillation Counting," but is really not relevant to nuclear medicine.

The concluding section "Application—Biomedical and Radioimmunoassays" possibly could have been in another volume but contains only four papers. The introductory paper, "Applications of Liquid Scintillation Counting to Radioimmunoassays," by Grafton Chase, is intended as an introduction to radioimmunoassay for the uninitiated. The other papers describe the adaptation of crystal detectors for use in a liquid scintillation counter, liquid techniques for quantitating iron-59 and chromium-51, and speculations regarding the future of liquid scintillation counting.

These volumes will find their way to the bookshelves of relatively few nuclear medicine practitioners but do contain information of interest and importance to any practitioner employing liquid scintillation techniques. Although this information is probably of greater importance for the occasional liquid scintillation user, those individuals would be better served by a straightforward primer on liquid scintillation techniques.

LYNN WITHERSPOON

Alton Oschner Medical Foundation  
New Orleans, Louisiana

**RADIOGRAPHIC EVALUATION OF THE SPINE—Current Advances With Emphasis on Computed Tomography.** M. Judith Donovan Post, Ed. New York, Masson Publishing USA, Inc., 1980, 738 pp, illustrated, \$135.00

There are few textbooks on radiology of the spine. Those