

times costly operations involved and the remedies used to overcome these difficulties. It is the first time that remote analytical chemistry techniques have been so extensively unified into one volume.

The editors of this work state that "remote analytical chemistry is chiefly a matter of applying standard techniques under difficult and demanding conditions..." and accordingly justify the publication of this volume "dedicated entirely to the techniques of doing analytical chemistry behind shielding or in glove boxes." This philosophy has resulted in a valuable addition to the literature of remote analytical chemistry.

Fourteen subjects are presented in detail in a unit operations style by specialists in the field and begin with a short history of the analysis of radioactive materials by remote methods. The following topics are covered: ordinary weighing and density determinations; thermogravimetric analysis; remote pipetting; application of titrimetry to remote analysis; techniques of sampling, dissolution, evaporation, and combustion; equipment and techniques for handling liquid samples; ion exchange and solvent extraction; fission gas collection and trace gas analysis; spectrographic analysis; instrumental methods including spectrophotometry, atomic absorption, and flame emission spectrometry; application of electrochemical techniques to remote analysis; analytical chemistry in gloved boxes; and the effect of radiation on common analytical reagents. The treatment of each subject is thorough for the most part, although stepwise analytical procedures are not usually included, and the book is well documented with a total of 1152 references. The material presented is not merely a compilation of data available elsewhere, but a critical examination of methods, equipment, and techniques. The chapters on "Sampling, Sample Dissolution, Evaporation, and Combustion" methods and "Equipment and Techniques for Handling Liquid Samples" in hot cells excel in their presentation of the basic techniques. It is unfortunate that the topic of analytical chemistry in gloved boxes, although adequately presented, was not treated in greater detail.

Although the subject of safety and

environmental protection is touched upon by several of the authors it is hoped that in the very near future the editors of this series will seriously consider an extensive treatment of safety in the remote analytical chemistry laboratory. In view of the recently increased emphasis on safety, the presentation of some facilities and operations in which plastics, solvents, and other combustible materials are widely used may now be unsatisfactory.

The authors readily admit that this volume is somewhat larger than originally planned. This reviewer cannot see how less material could have been included without destroying the continuity and usefulness of the work. In fact, if there is any major criticism of the book it is in its "failure" to specifically treat in-depth topics such as material and equipment life, the preparation of highly radioactive samples for off-site shipment, the use of standards, and the safety aspect. Furthermore, the inclusion of more material from our overseas colleagues would have been beneficial if for no other reason than for comparison purposes.

There is wide use of descriptive material in the form of tables, diagrams, and photographs included with the text. The two appendixes consist of an interesting but incomplete tabulation and brief description of both domestic and international shielded facilities and a short listing of general literature references. There are only a few typographical errors in evidence, and the references are complete up to 1967.

Generally, the authors have succeeded in presenting the techniques and analytical methods best suited for operations in hot cells and gloved box facilities. In this sense the book can be recommended as a guide to the novice and as a working reference to the experienced analyst.

Charles E. Pietri is a graduate of New York University (1951) and has worked at Oak Ridge National Laboratory, Savannah River Laboratory, and Los Alamos Scientific Laboratory, and is presently chief of the Plutonium Chemistry Section at the U.S. Atomic Energy Commission's New Brunswick Laboratory. He has been actively engaged in remote analytical chemistry in gloved boxes and hot cells during this period.

Title *In Vitro* Procedures with Radioisotopes in Medicine, Proceedings of a Symposium, Vienna, Sept. 8-12, 1969

Editor Staff IAEA

Publisher Unipub, Inc., P. O. Box 433, New York, N. Y. 10016 (1970)

Pages 176

Price \$20.00

Reviewer Richard C. Reba

Radiometric analyses have been known for many years, but it was not until the ingenious experiments of Yalow and Berson were published that a new field was born, that of *in vitro* procedures using radiotracer labeled substrates. These techniques add several magnitudes of sensitivity and specificity that were virtually unknown before this time to a host of analytical procedures that have now been perfected so that hormones with a molar concentration in plasma of as little as 1×10^{-12} (nocturnal ACTH) can be measured with exacting accuracy and precision. The principle is of such a universal nature that presently few hormones escape detection by these methods, which have been broadened to include enzymes, enzyme substrates, drugs, vitamins, antibodies and other inhibitors, small amino acid chains, and it is apparent that the list is endless.

Because of the great appeal of this technique and the many workers in the field, many of the important advances were scattered in a variety of technical and clinical journals. It was not until the proceedings of an Oak Ridge Symposium published in June 1968 (*Radioisotopes in Medicine: In Vitro Studies*) that a review and report of the current state of the art was available in a single publication. Since that time, there have been reports of several other symposia, but these have usually been problem-oriented and the topics have been from a relatively narrow field. The universality of the technique has attracted workers from all over the world. The need to document again the current state-of-the-art of this revolutionary technique, as well as to bring together

improvements generated by laboratories all over the world, was obvious as soon as the Oak Ridge Symposium was published. This new IAEA Symposium lists the progress in the applications of these various radiotracer techniques in the fields of cytological and immunological studies, and derivative, dilution, and enzymatic analysis. As expected, there is particular emphasis on the applications in endocrinology (T-4, T-3, insulin, TSH, FSH, LH, testosterone, androstenedione, pregnenolone, cortisol, angiotensin-II, estradiol, and aldosterone). Classical radiometric techniques are used to describe new methods of analysis for oxalate in urine and for copper in plasma. The discussions and questions that follow each paper are critical and pointed, rather than

the usual polite platitudes that one ritualistically is accustomed to sitting through at international meetings.

Advances have been so rapid that, although the present volume is an excellent and comprehensive reference source for September 1969, and the editors and publishers are to be complimented for their swift publication in view of the complexities of obtaining and editing 50 papers from participants in 32 countries, it is as apparent with this volume as with the Oak Ridge volume, that workers in the field already look forward to the subsequent compilation.

Richard C. Reba, MD, FACP, has been the chairman of the Department of Nuclear Medicine at the Washing-

ton Hospital Center since January 1970. Prior to assuming his present position, Dr. Reba was associate professor of Radiological Science, associate professor of Radiology, assistant professor of Internal Medicine, and Chief of the Clinical Section of the Division of Nuclear Medicine at the Johns Hopkins Medical Institutions. A Diplomat of the American Board of Internal Medicine, Dr. Reba now devotes his full efforts to the recently recognized medical specialty of Nuclear Medicine. He is author or co-author of more than 50 publications in professional journals, monographs, and textbooks. His published subjects include not only physiology and pathology, but also analytical techniques, whole body counting, health physics, and activation analysis of trace elements.