

contains one section, which may be of special interest to the readers of this journal, on the use of a bubble chamber as a high-efficiency spectrometer for low-energy neutrons, giving very good energy resolution.

The translation is generally good in that the language is fairly relaxed and normal, but the book contains a large number of errors, most of which seem clerical in nature. Where they result in misspelled names, they are of little importance, but where they yield incorrect functional relationships, they become irritating.

R. I. Louttit is a Physicist in the Bubble Chamber Group at Brookhaven National Laboratory. Aside from research in high-energy physics, his principal work has been in the design and operation of hydrogen bubble chambers. He received his PhD from Washington University in St. Louis in 1958 and has since been at Brookhaven except for 1963 and 1964, when he was at the Center for Nuclear Research at Saclay, France, to oversee the construction of a hydrogen bubble chamber for the Deutsches Elektronen Synchrotron in Hamburg, Germany.

ELEMENTARY, MY DEAR WATSON

Title Proceedings of the First International Conference on Forensic Activation Analysis

Editor Vincent P. Guinn

Publisher Gulf General Atomic, 1967

Pages ix + 314

Price \$7.00

Reviewer Mary T. Kinsley

These proceedings cover 24 papers presented at the First International Conference on Forensic Activation Analysis, held in September 1966 at General Atomic Laboratories in San Diego, California. The conference was attended by law enforcement people and most of the nuclear scientists active in the field of forensic activation analysis. Papers were presented by both

groups. Nine countries were represented at the Conference: Australia, Brazil, Canada, England, France, India, Japan, Scotland, and the United States. The conferees were introduced to the neutron activation method, to the past and current trends in forensic activation analysis, and to the legal aspects involved in the acceptance of data obtained by a rather new scientific method.

The conference was divided into three sessions. Conferees were introduced to "Forensic Activation Analysis" in the first session. Scientific papers in this session described the method, related pioneer work in the field, and explained the composition of activation analysis laboratories of various complexities. Legalistic papers in this session related the Internal Revenue Service utilization of the method and the difficulties encountered in the introduction of a new scientific method in court. "Forensic Activation Analysis of Various Evidence Materials" was dealt with in the second session. The papers described the application of activation analysis to prove the authenticity of old paintings, regenerate old documents, compare paint samples, analyze commercial glasses, detect gunshot residues, and characterize ammunition. The third session was devoted to the "Neutron Activation Analysis of Hair." Hair is widely studied in forensic science because it is a very common piece of evidence in criminal cases.

The application of activation analysis to forensic problems is not well developed technically. Only a small number of people with limited support are working in this field; therefore, the results are limited and much more study is needed. The forensic scientist should evaluate this technique with other technologies such as gas chromatography, emission spectroscopy, atomic absorption spectrometry, and mass spectrometry. Neutron activation analysis probably has greater potential because of its sensitivity, specificity, and the nondestructive nature of the analysis when matrix effects can be compensated for or eliminated. Many interesting applications in the book illustrate the present development of neutron activation analysis in forensic science and the value of acquiring compositional data while keeping the evidence intact. However, more intensive studies for all types of

criminal evidence are needed before the method can be accepted. It would be hazardous to rush such evidence into court before the method is fully developed. Libraries of reference data, accurate correlation and interpretation of data, and standard reference materials are needed. The increased potential described by some conferees could then be realized. For example, they suggest sample coding—the intentional addition of stable, easily activated isotopes to manufactured products that will help identify and trace the origin of samples used as criminal evidence.

Increasing interest by law enforcement people makes the book's appearance particularly timely. These proceedings should introduce the method and help them understand its limitations as well as its great potential. Activation methods are not readily recognized and accepted, even by the scientific community, since they are not generally well known and are usually handled by a specialist. Rather elaborate and expensive facilities are necessary; therefore, the method must be "sold" by dispersing information. Scientific acceptance is imperative before the method can be accepted in the courts. Legal authorities usually follow a traditional conservative approach. More cooperation and understanding are needed between scientists and legalists so that this method can be utilized to solve forensic problems.

The compilation in one book of all neutron activation work relating to forensic science is the chief value of this volume. Several pictures of attendees in conference and touring the laboratory and views of the site in general contribute very little to the book. Activation analysts will find no new work presented in these proceedings but may be interested in the problems encountered in the introduction of new scientific methods in court and in the judgment of the scientific merits of these methods by lay persons whose backgrounds are not generally associated with science. Law enforcement people are introduced to a new method that has the potential of replacing several old nonspecific forensic methods and of expanding the capabilities of forensic science.

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University in New York and an MS degree in Chemistry from the University of Kentucky. She is a chemist in the Analytical Chemistry Group of the Nuclear Engineering Department at Brookhaven National Laboratory and has worked with radiochemical and activation analysis techniques for many years.

OF CABBAGES AND KINGS

Title Advances in Nuclear Science and Technology, Vol. 4

Editors Paul Greebler and Ernest J. Henley

Publisher Academic Press, Inc., 1968

Pages xiv + 394

Price \$18.50

Reviewer J. Chernick

The proliferation of books, journals, and miscellaneous documents in nuclear science and engineering is staggering to one who is trying to keep abreast of the entire field. The specialist has long since given up the attempt and has narrowed his selection of reading material. Bibliographies and review papers are of some help, but in the end one must concentrate on the work of one's peers in his specialty.

The best review books are still those that are painstaking labors-of-love by individual experts. However, the law of demand and supply has led to reviews with a variety of authors and subjects. Examples of the latter are the USAEC's *Quarterly Technical Progress Reviews, Reactor Technology Selected Reviews* in 1964 and 1965, and the continuing annual publications by Academic Press of *Advances in Nuclear Science and Technology*. Since libraries will buy almost any book, there has been a rush by publishers to print in book form the papers presented at almost any conference. By chance, a good paper in your chosen field just might appear in one of these books.

Advances in Nuclear Science and Technology, 4 contains articles on 1) gas-cooled reactor technology, 2)

3) a 1000 MWe fast breeder design, 4) the doppler effect in fast reactors, 5) optimum control theory, 6) perturbation theory, and 7) industrial uses of ionizing radiations. The authors are respectively 1) H. B. Stewart, C. L. Richard, and G. B. Melese, 2) K. P. Cohen and G. L. O'Neill, 3) R. B. Nicholson and E. A. Fischer, 4) R. A. Meyer and B. Wolfe, 5) J. Lewins and A. L. Babb, 6) J. Lewins, and 7) S. Jefferson, R. Roberts, F. J. Ley, and F. Rogers.

The authors are all recognized experts and make a careful attempt to bring the state of the work in their topic up to date. However, the tendency for review papers to become rapidly dated is shown by the fact that the General Atomic paper does not include recent experience on Peach Bottom, and the General Electric BeO moderated fast reactor design does not include the effect on their design of the recently discovered uncertainties in the capture-to-fission ratio of plutonium at intermediate energies. The paper by Nicholson and Fischer lacks a quantitative discussion of the influence of different spin states for ^{239}Pu resonances, while the work of Meyer and Wolfe fails to include important recent work such as that of Moss and Rhoades of Atomic International.

Despite such shortcomings, the above papers on fast breeders and advanced gas-cooled power reactors are all thorough critical reviews that are well worth reading.

In addition, the book contains a balanced review of industrial applications of ionizing radiations by a team from the AERE Wantage Research Laboratory. Finally, the two articles, involving J. Lewins as an author, review work using bang-bang theory on reactor control problems, and some possible extensions of perturbation theory including the formulation of perturbation theory for heterogeneous systems.

Jack Chernick is a senior physicist and Associate Head (for theoretical physics) of the Reactor Physics Division at Brookhaven, where he has been since 1947. An alumnus of the University of Chicago and of Brooklyn College, Fellow of the ANS, and a member of both the Editorial

Advisory Committee for Nuclear Science and Engineering and Brookhaven's Scientific Council, he has authored numerous papers on reactor physics theory.

LUCID, AUTHORITATIVE, AND CURRENT

Title Progress in Nuclear Techniques and Instrumentation, Vol. III

Editor F. J. M. Farley

Publisher North-Holland Publishing Co., 1968

Pages 3 + 255

Price \$13.50

Reviewer D. Allan Bromley

This slim volume maintains the high standard that Farley has established for this Progress series. It comprises three articles: by B. W. Montague, of CERN, on Radio Frequency Separation; by G. T. Ewan, of Chalk River, on Semiconductor Spectrometers; and by T. Alväger and J. Uhler, of the Swedish Research Institute of National Defense, on Electromagnetic Isotope Separation for Laboratory Purposes. These four authors are internationally recognized experts, and their articles are lucid, authoritative, state-of-the-art presentations.

In Montague's case, the discussion is focused on the future inasmuch as only three radio frequency separators have yet been realized (and two of these at CERN and Brookhaven are essentially identical). He provides an excellent introduction to separator theory based on the discovery of the previously unsuspected solution to Maxwell's equations—surely considered to have been among the most thoroughly understood physical situations!—leading to the hybrid E_{11}/H_{11} separator cavity mode and discusses its practical applications. Particularly useful is the discussion of limitations of various designs in terms of transmission, maximum momenta, etc. This article is essential reading for anyone seriously interested in the rf separation problem in elementary particle physics.