is mentioned in connection with the experiments of H. Boersch and coworkers [*Z. Physik*, **187**, 97 (1965)] has experienced vigorous development in both experimental and theoretical aspects beginning in 1967, but is not mentioned.

It is unfortunate that the term "resonance radiation" is applied by the author to that radiation which arises when a uniformly moving fast charged particle passes through a medium whose dielectric or magnetic properties vary periodically in space. The same term is applied, beginning in the early days of atomic physics, to describe the radiation at a given wavelength emitted by an atom which has absorbed light of the same wavelength from an external source.

Despite the minor defects mentioned above, this monograph represents a valuable addition to the literature. The typography and binding are attractive and appear quite durable. It should be in the library of all serious workers in this field.

R. H. Ritchie is a physicist on the staff of Oak Ridge National Laboratory and on the faculty of the Physics Department of the University of Tennessee. He has worked in the fields of health physics and radiation physics. His interests include the theory of the interaction of charged particles with matter, transition radiation, collective effects in condensed materials, electron slowing-down spectra in matter, and plasma oscillations in solids. He is a fellow of the American Physical Society and a member of the Health Physics Society and the Radiation Research Society.

Scattering Theory: The Quantum Theory on Nonrelativistic Collisions

Author	John R. Taylor
Publisher	John Wiley & Sons, Inc. (1972)
Pages	477
Price	$14.95
Reviewer	Marcel Coz

The scope of *Scattering Theory: The Quantum Theory on Nonrelativistic Collisions* is defined in the Preface: the book is intended for the student who wants a thorough grounding in scattering theory and has taken a one-year graduate course in quantum mechanics. The book is therefore a textbook and any judgment on its value depends on this basic fact.

As the author points out, the book results from a course he has already taught; it was quite easy for me to verify this assertion. Prof. Taylor, a careful teacher, is not afraid of pedestrian methods (see, for instance, p. 50). From time to time one finds in his text traces of the verbal style a professor uses in front of his classroom; one reads "celebrated formula" (p. 4), "celebrated connection" (p. 60), "we apply the famous trick" (p. 14).

Mr. Taylor is convinced that a rigorous treatment of the scattering problem is important and that emphasis must be given to the time-dependent formulation. I must acknowledge that he succeeds in transmitting his conviction. The sections on the scattering operator and *S*-matrix are excellent and justify Prof. Taylor's decision to emphasize the time-dependent formulation. Mr. Taylor is obviously familiar with the mathematical treatment of the scattering problem as it has been proposed by Jauch and his followers; I express my surprise not to see the name of Jauch[1] mentioned in a book his work has made possible. A second part deserves special compliments; it concerns the study of the analytical properties of the *S*-matrix.

Within the framework of a one-year course a choice must be made among the material. Nothing is therefore said on Fredholm's methods and the condition of their validity, nothing on the inverse problem, nothing on the few-body problem.

Reading the almost 500-p. volume, I have noted some inaccuracies, but not very many. To give an example of their importance, on p. 115 one finds the identity

$$(u \cdot \sigma)\,(v \cdot \sigma) = uv + i\,(u \times v)\sigma$$

Clearly this equation requires the existence of commutation relations between u, v, σ; this requirement is not mentioned. However in this case the formula is applied correctly.

I would call attention to two interesting references. With respect to p. 82, Jauch[2] has proved the existence of a Hamiltonian under the conditions of causality, homogeneity, and continuity; with reference to p. 266, M. C. Barthelemy[3] has considered the analyticity of the solutions for the Dirac equation. I would be surprised if she has not looked at the Jost solutions.

To conclude, in spite of its omissions this is a good textbook and I have enjoyed reading it. (Although I did not go over the problems at the end of each chapter, a glance convinced me of their relevance.)

REFERENCES

1. J. M. JAUCH, *Helv. Phys. Act.*, **31**, 127 (1958); **31**, 666 (1958).

2. J. M. JAUCH in *Dispersion Relations*, G. R. SCREATON, Ed., p. 203, Oliver and Boyd, Edinburgh (1961).

3. M. C. BARTHELEMY, *Ann. Inst. Henri Poincare*, **6**, 365 (1967), **7**, 115 (1967); *C. R. Ac. Sc., Paris*, **268**, 521 (1969).

Marcel Coz [Docteur-es-Sciences (State degree), Paris, 1960] was "charge de recherches" at Faculte des Sciences of the Paris University. He obtained a NATO fellowship at MIT in 1964 and came to the United States in 1966. He is currently associate professor of physics at the University of Kentucky. His field of interest is theoretical nuclear physics.

Microscopic Theory of the Nucleus

Authors	Judah M. Eisenberg and Walter Greiner
Publisher	American Elsevier Publishing Co., Inc.
Pages	519
Price	$33.50
Reviewer	Richard K. Osborn

The microscopic theory of the nucleus consists of the attempt to derive the details of the structure of many-nucleon nuclei from an assumed two-nucleon interaction. This is obviously an important task, although at the present time a somewhat frustrating one since the nucleon-nucleon interaction is not really known; in fact, it is not yet known for sure that only two-body forces will suffice to describe all of the properties of many-nucleon nuclei. In addition, because the usually assumed two-nucleon potentials are rather cumbersome functions of internucleon displacements and relative spin orientations, the microscopic theory poses a severe challenge to analysis.

In fact, a substantial portion of *Microscopic Theory of the Nucleus* is devoted to meeting this challenge. Analytical techniques for making calculations to compare with measurements are developed and explored with considerable thoroughness. This aspect makes it a valuable *how to do it* reference, but it also implies a strong orientation toward the serious research-motivated student of nuclear structure physics. Obversely, it implies equally forcefully that there is little here readily available to the reader whose primary reason for picking the book up is to acquire some qualitative conception and understanding of the ideas, successes, gaps, and failures of the microscopic theory of the nucleus.

In the Preface, the authors assert that ". . . this volume is intended to be usable by anyone who has had a conventional one-year course in quantum mechanics." Personally, I am a bit skeptical of this assertion. It might be applicable to a second-year physics graduate student who has just completed a (somewhat unconventional) first-year graduate course in quantum mechanics. The point is not that there is all that much mystery to quantum mechanics as a scheme for axiomatizing our description of nature, but rather that early in the book the authors introduce, and use, sophisticated formalisms (e.g., second quantization) and computational methods (e.g., diagram analysis) in order to describe calculational techniques required for a quantitative understanding of the microscopic theory. I doubt that many first-year courses in quantum mechanics prepare students to move comfortably among these formalisms and computational methods without resorting to considerable supplementary study.

This book is the third in a series of three volumes, each of which is supposed to be independently usable and useful. I am not personally acquainted with the first two volumes, but I feel sure that some familiarity with at least some of the notions and concepts developed and discussed in those volumes would be very helpful to the reader of the third volume.

The exposition of the microscopic theory as presented in this volume is excellent for its purpose, namely to provide a rather comprehensive and detailed theoretical reference to the subject for persons involved in research on nuclear structure. To my knowledge it may also be unique, for I know of no other work that treats this matter so thoroughly.

Richard K. Osborn (BS, MS, Michigan State University; PhD, theoretical physics, Case Institute of Technology, 1951) spent six years at Oak Ridge National Laboratory, dividing his time equally among the Physics Division, the Applied Physics Division, and ORSORT. During that same period he was also a lecturer in physics at the University of Tennessee. In 1957 he joined the nuclear engineering staff at the University of Michigan. Dr. Osborn's research activities have been quite varied, with interests in nuclear physics, reactor physics, kinetic theory, noise analysis, and the interaction of photons with electrons and atoms.

Isotopes and Radiation in Soil-Plant Relationships Including Forestry

Author	International Atomic Energy Agency
Publisher	Unipub, Inc.
Pages	110
Price	$21.00
Reviewer	Wallace H. Fuller

The International Atomic Energy Agency publication entitled *Isotopes and Radiation in Soil-Plant Relationships Including Forestry* is a proceedings of the symposium on the use of isotopes and radiation in research on soil-plant relationships including applications in forestry, jointly organized by the International Atomic Energy Agency and the Food and Agriculture Organization of the United Nations, held in Vienna, December 13-17, 1971. This is the latest of several symposia organized by these two agencies on the same subject since 1964. A new feature on the program in 1971 is the inclusion of papers on forestry.

The thrust of the program with its 54 papers, which brought together 226 eminently qualified participants, is toward the plant chemist concerned with food, fiber, and tree production. And why not! Those in the physical sciences of chemistry, soils, and water will also want to have this excellent review readily available as a research tool. Each author featured is prominently known and well-published in his subject-matter field. Theory as well as application is often presented in these papers on isotope use in research. Such topics as ion uptake and translocations, chemistry and analytical methods, soils and water regime, soil fertility, and plant nutrient availability, to name a few, are reviewed in depth and in light of the most recent information.

Although most authors point out new and productive areas for future investigation by expanding on their own research, a few appeared so wrapped up in a presentation of their own studies that their reports will capture only a limited audience.

Isotopes and Radiation in Soil-Plant Relationships Including Forestry can be recommended to a wide range of scientists, researchers, teachers, and field personnel in the life sciences, forestry, agronomy, soils, water, and crop production, to biochemists and botanists as well as plant and nuclear chemists and water physicists, with an assurance that the readers will benefit greatly from the multi-authored presentation.

Wallace H. Fuller, born in Alaska, grew up in the Pacific Northwest, where he obtained the BS and MS in soils and soil chemistry. He completed the PhD at Iowa State University in soils and biochemistry. After five years as research associate at Iowa State University, he was called to the USDA, Beltsville, Maryland, to undertake research in biochemistry, nuclear chemistry, and microbiology of soils as they relate to food and fiber production. Since 1948 he has been on the faculty of The University of Arizona, Tucson, where in 1956 he moved from associate professor and biochemist to professor, biochemist,