

DYNAMICAL PROPERTIES OF SOLIDS in three volumes

Edited by G. K. HORTON

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(University of California, Irvine)

This series of volumes contains detailed discussions of all topics of current theoretical and experimental interest in the field of lattice dynamics. The discussion of these topics is prefaced by chapters dealing with the fundamental concepts of the theory of lattice dynamics, which make this series of books a self-contained exposition of the subject. Each chapter is written by one or more experts in the subject matter of the chapter. These books should be of interest and of use to all workers in the field of the dynamical properties of solids, as well as to solid state theorists in general.

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CRYSTALLINE SOLIDS, FUNDAMENTALS.

1974, scheduled for June

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1974, scheduled for December

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R. F. Wallis, Surfaces

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CRYSTALLINE AND NON- CRYSTALLINE SOLIDS

1975 in preparation

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little smugly perhaps, by the non-HEP community. It is attractively produced and I found John Ziman's foreword not the least attractive part of the whole publication.

* * *

E. H. S. Burhop is a professor of physics at University College London and a Fellow of the Royal Society. He has published many papers dealing with x rays, nuclear physics, the physics of collisions, the Auger effect and high-energy physics.

Particle Physics: An Introduction

M. Leon

268 pp. Academic, New York, 1973.

\$14.50

In some measure the maturation of a field of physics can be established by the audience to whom introductory texts are addressed. When this audience begins to include advanced undergraduates, one may with reasonable confidence conclude that an agreed-upon and significant body of knowledge has been accumulated. Further, one may be quite sure that this wealth of knowledge has sufficient importance in physics as a whole as to command the attention and excite the imagination of this group of budding physicists.

On this basis, at the very least, elementary-particle physics has certainly shown very healthy signs of maturity. The book by M. Leon represents one of several introductory volumes that present to advanced undergraduates and graduate students the basic ideas and intellectual developments in particle physics. The selection of topics discussed shows both good taste and pedagogical accuracy. After reviewing basic facts about Lorentz covariance and relativistic-wave equations, the author treats the very important subjects of symmetry, isospin and unitary symmetry and discusses the evidence for the plethora of resonances and the beautiful ideas on how they may be organized by use of these symmetries. Standing on this solid foundation of hard facts and elegant concepts, Leon presents a variety of more speculative, less well established, but enormously intriguing ideas floating about on the fringes of research in particle physics: quarks, bootstraps, and the like.

This book certainly is successful in its selection of topics of importance. The omission of certain matters and the discussion of others, however, weakens what might otherwise be a valuable as well as useful textbook. For specific illustration let me mention an omission and a weakness of dis-

cussion. In a generally very attractive chapter on weak interactions, the author comes to the verge of (but omits) the ideas of the partial conservation of axial currents and of the algebra of currents. To have discussed currents for so long and to have not brought to the reader the beautiful developments of a decade ago is quite unfortunate. Further, in his section on SU(3) symmetry and the broken nature of that symmetry, I feel Leon has made a false pedagogical step by passing without comment on the issues involved in the understanding of broken symmetries in relativistic quantum physics. It is useful to contrast the presentation here with the fuller treatment in the admittedly more ambitious book by Stephen Gasiorowicz, (*Elementary Particle Physics*, Wiley, 1967).

On the basis of these short remarks I would encourage the student to utilize the text by Leon in his introduction to particle physics but by no means to rely on it alone. This book used in conjunction with the far more satisfactory, albeit more advanced, volume of Gasiorowicz might well make a useful pair in a senior or graduate course. The interested student can then rather naturally flow into a study of heavier material and even the more casual student will be tempted. Just in passing I found it remarkable that the text by Gasiorowicz, generally regarded by students as first-rate, receives no bibliographical mention in this book. Perhaps in the edition of this book that cleans up the several typographical errors, this omission can be rectified.

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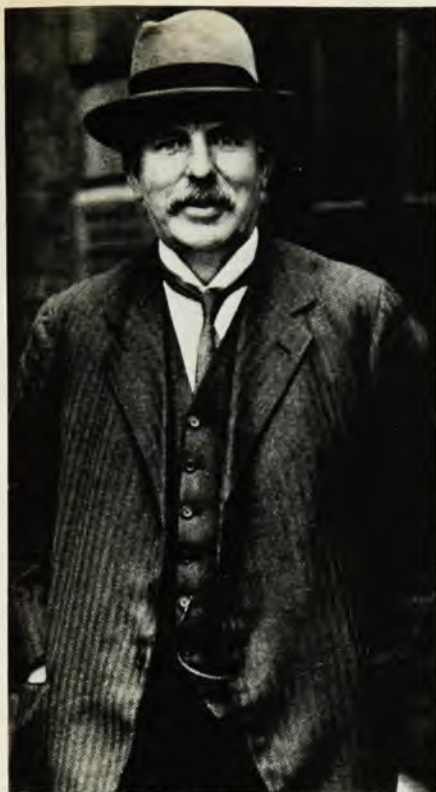
Lord Rutherford

Norman Feather

195 pp. Crane, Russak, New York, 1973.

\$10.50

Descriptions of Ernest Rutherford's career are customarily trisected into his three professorships, at McGill, Manchester and Cambridge Universities. By chance, former research students from each of these institutions have written lives of their mentor. A. S. Eve (*Rutherford*, 1939), as befitted his generation, wrote a "Victorian" life and letters. The narrative of this "authorized" work, in fact, is little more than connective prose between letters. In apparent rebellion against this type of product, Norman Feather (*Lord Rutherford*, 1940) wrote a "scientific biography." Finally, E. N. da C. Andrade (*Rutherford and the Nature of the Atom*, 1964) furnished us with the



RUTHERFORD

most literarily graceful and historically perceptive book, although it is too thin to do justice to its subject. Andrade's biography, moreover, sparkles when describing the pre-World-War-I Manchester with which he was familiar, while no similar feelings of turn-of-the-century Montreal, or Cambridge-of-the-1930's are evoked by Eve or Feather, respectively.

Feather's book, now reissued, stands on other merits. It is a straight-forward, clear, fairly short and readable account of the main lines of Rutherford's research. The several works for which he is famous—the disintegration theory of radioactivity (with Frederick Soddy) of 1902–1903, the nuclear atom of 1911, and artificial disintegration of elements, 1919—are naturally emphasized. Other topics are also discussed, though rarely in depth, and the book's chronological arrangement effectively precludes thematic continuity. This is probably satisfactory for the book's presumed audience, the intelligent layperson, and even desirable for one who would collect the entire original series (which includes lives of Sir Edward Elgar, Jellicoe, Lord Kelvin, Marshal Foch, and Lord Kitchener).

To the extent that the biography devotes space to Rutherford's laboratory accomplishments, Feather has indeed written a scientific life. Yet, aside from a first chapter on "The Outlook of the Scientist," which is part philosophical and part background material, these accomplishments are rarely seen against any description of contemporary science. Rutherford's New Zea-

land youth and many subsequent events in his career are presented, giving a reasonable overview of his life, but one is left feeling that this life has not been related to its scientific times.

With the hindsight of more than three decades since the book's original publication, it is interesting to see that Feather, a distinguished alumnus of Rutherford's Cavendish Laboratory, at the time felt no need to discuss the details and importance of such topics as C. E. Wynn-Williams' advances in electronic counting of particles, Rutherford's early work in nuclear fusion or the influence of theory upon the laboratory's experimental progress. Nor is Rutherford's role as a power in the "establishment" of science analyzed. Presumably, these subjects were not then considered significant enough. Since the book is a virtually unaltered reprint, these points are offered as insights to a 1940 viewpoint, not as criticism. What may be regarded with some slight unhappiness, however, is the missed opportunity to add a few words to this 1973 edition regarding the laboratory's altered direction, under Rutherford's successor, W. L. Bragg, away from nuclear physics, into pioneering research in molecular biology and radioastronomy.

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IR—Theory and Practice of Infrared Spectroscopy

N. L. Alpert, W. E. Keiser, H. A. Szymanski
380 pp. Plenum, New York 1973. \$7.95

Infrared spectrometers and spectrophotometers are standard equipment in many laboratories. A variety of commercial models is available ranging from relatively inexpensive apparatus with limited versatility to complex instruments offering the choice of many operating modes. They can all be used for qualitative and quantitative analysis and the spectra produced can aid in the structural analysis of molecular compounds. However, the usefulness of the data and of their interpretation depend on the skill and experience of the operator.

This paperback, which is derived from the second edition (1970) of a book first published in 1964, is a helpful introduction to the chemical applications of infrared spectroscopy. The authors discuss the operation and characteristics of typical spectrophotometers and the relationships between the spectra and the structures of absorbing molecules.

Nelson Alpert and William Keiser, both of whom have associations with

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Proceedings of the International Winter School Schlading on Nuclear Physics

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