topics concerning S-matrix theory including unitarity, Lorentz invariance, TCP, crossing, unstable particles.

Comparison with Chew's book having the same title is unavoidable and quite instructive. It is quite evident that Eden and his colleagues have tried to deëmphasize the philosophical content of the theory and to avoid high-brow discussions on the future of the theory of elementary particles. Their aim has been mainly technical and they have written a book for the young physicist who wants to reach a professional level through a detailed knowledge of the relevant methods and also for the not-so-young who wants a useful reference book. Despite the title the work of Eden et al does not overlap with that of Chew although in principle they speak on the same subject, using the same methods. Although I think it is not the fault of the authors, I am personally unsatisfied by the status of the theory expressed in chapter 2. My feeling is that chapter 2 will have to be replaced in the future by more advanced techniques borrowed from algebraic homology. In spite of interesting attempts in this direction by Pham, Fotiadi, Lascoux, Froissart and others we are far from having achieved anything worth using as a replacement.

Until that day the best we have is a sort of heuristic theory that becomes rapidly inadequate for higher-order graphs. The book is in general written in a clear and satisfactory style. It contains however some clearly wrong or misprinted formulas (for example 1.5.34, page 36), and there is a definite tendency toward neglecting the "constant multiplicative factors" in writing integrals (2.2.1, page 51); this tendency is quite excusable during a spoken lecture but I do not like it in a widely published book.

Apart from these minor flaws the book fills quite efficiently an existing gap in the literature. It is not, as should be clear by now, a general treatise on field theory; for it does not deal with topics like Wightman axioms, local algebras, function spaces, distributions, etc., but these are adequately covered in the existing literature. In its own field, however, it will be an extremely useful book for many years.

* * *

Tullio Regge, professor at Turin University and permanent professor at the Institute for Advanced Study, received the 1964 APS-AIP Heineman Prize for "introducing into particle theory the concept of analytic continuation in angular momentum."

The history of radioactivity and nuclear fission

OTTO HAHN: A SCIENTIFIC AUTOBIOGRAPHY. Translated and edited by Willy Ley. 296 pp. Scribner's, New York, 1966. $7.95

by R. Bruce Lindsay

A well written autobiography of a celebrated scientist can not fail to be of interest to the scientific community since it is almost sure to provide some historical perspective on the field of activity of the scientist and may occasionally give insight into his research methods. When the field is that of nuclear chemistry and physics and the author is the distinguished co-discoverer of nuclear fission, the relevance of the work woud appear to make it particularly attractive to scientists and laymen alike. This is indeed a readable book though it must be stressed at the outset that it leans very heavily on the rather detailed description of the author's scientific researches and tells less of his personal life than most readers expect to find in an autobiography.

Otto Hahn started his professional career as a more or less routine organic chemist with the expectation of a life in industrial research. It was indeed a lucky accident that led him to be sent to England in 1901 to work in Sir William Ramsay's laboratory in University College, London. His firm sent him ostensibly "to learn English," but he learned far more than the language; for Ramsey set him to work on the chemistry of the newly discovered radioactive materials. This was the beginning of the scientific preoccupation which has marked the whole of Hahn's career.

This volume traces the story of the author's visit to Ernest Rutherford's laboratory at McGill University in Montreal in 1905–06 and his interesting researches on thorium there. On his return to Germany he became a member of the Chemical Institute of the University of Berlin and for six years continued his work on nuclear chemistry but at the same time gradually got more involved in physical research through his scientific collaboration with the physicist Lise Meitner, a coöperative venture that had important scientific consequences. With the founding of the Kaiser Wilhelm

OTTO HAHN has been called "the father of radiochemistry and its more modern offspring, nuclear chemistry."

GEVAC NEWS

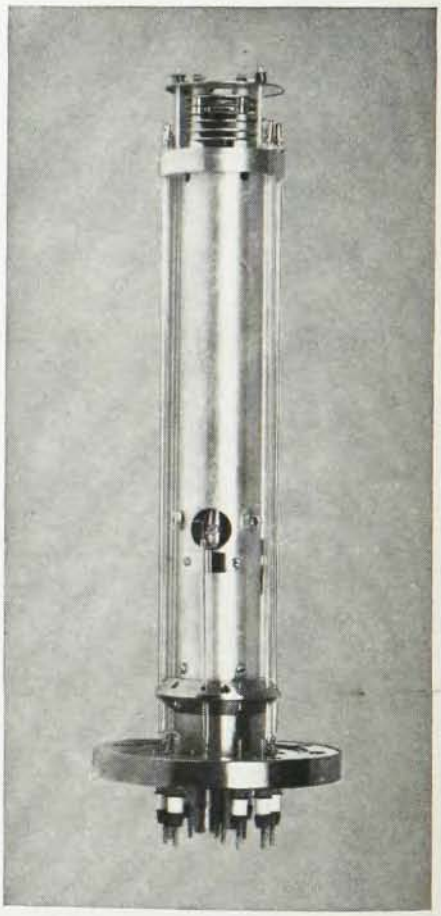
INNOVATIONS IN VACUUM AND INSTRUMENTATION

Meet the Monopole 600– Latest GE Innovation in Mass Spectrometers

■ This new Mass Spectrometer is the offspring of improvement. It adds the latest GE innovations to the successes of its predecessors. Greater scanning flexibility has been designed into the Monopole 600. Its wide range extends from 1 to 600 amu with only one range setting—no time-consuming adjustments are necessary as in other devices. And choose your scanning speed in either manual or automatic. Display is linear and resolution consistently high across the spectrum with no reduction in sensitivity. You can measure total pressures or detect partial pressures to below 10^{-14} torr.

Newly designed, the analyzer tube needs no magnet and is bakeable to 400°C. Two models are now available. The full-penetration type can be inserted into your chamber with elements exposed and ion source and sensing head unobstructed. The fully-immersible type is designed for those who require versatility of tube positioning.

For more information on all GE vacuum products, systems, and instrumentation, contact any one of GE's nationwide Vacuum Products Sales Specialists or Representatives. Or write to Section 268-30, Vacuum Products Business Section, General Electric Company, Schenectady, New York 12305.



GENERAL ELECTRIC

VISIT GENERAL ELECTRIC'S EXHIBIT, BOOTHS 2–5, AT THE AMERICAN VACUUM SOCIETY SHOW IN KANSAS CITY—OCT. 25, 26, 27.

Institute for Chemistry in 1912, Hahn was invited to head a department of radioactivity at the institute and remained there until the end of the second world war in 1945. The account of this scientifically very fruitful period of his life is entirely devoted to his researches. There is a graphic description of the confusion and uncertainty surrounding the early work that led to the epoch-making discovery of uranium fission in 1939. Full credit is given to the previous work of Enrico Fermi, Irène Joliot-Curie, and the later explanatory considerations of Meitner and Otto Frisch. The only reference to the realization of the possible technological significance of nuclear fission is a one page discussion of S. Flügge's paper in a later issue of the same volume of *Die Naturwissenschaften* (volume 27, 1929) in which the fundamental article on uranium fisson by Hahn and Strassmann appeared. Nothing is said about German military research on the atomic bomb, and the author contents himself with describing his work in the period 1940–45 on the disentanglement of the various radioactive substances produced by fission.

As has already been intimated, practically the whole book is restricted to descriptions of the scientific research carried out by the author and his collaborators. This is set forth in clear if somewhat pedestrian style. To the historian of science the material will serve as a very valuable source for the development of the history of radioactivity and nuclear physics. Even the layman will catch some of the spirit motivating the researcher and will admire the insight and skill with which his experiments were designed and carried out.

Three appendices, totalling some 80 pages, contain translations in full of three of Hahn's important papers, including the famous one of 1939. A complete bibliography of his publications and a series of photographs of Hahn and some of his celebrated contemporaries add to the interest and value of the volume. Glenn T. Seaborg's introduction provides a useful setting, with its emphasis on the technological implications of nuclear fission.

* * *

The reviewer, Hazard Professor of Physics at Brown, is a member of the American Institute of Physics advisory committee on the history and philosophy of physics.

Mechanical properties of metals

ELEMENTS OF MECHANICAL METALLURGY. By W. J. McGregor Tegart. 259 pp. Macmillan, New York, 1966. Cloth $8.95, paper $4.95

by Daniel B. Butrymowicz

Volumes of the Macmillan Series in Materials Science have been generally well received since their initial publication in 1964. Tegart's contribution to the series continues the line of quality one has come to expect from this series.

The author makes use of the approach practiced in the lecture courses for students in the metallurgy department at the University of Sheffield. The book was written with the aim of providing a background of basic information against which readers can set their knowledge of dislocation theory in order to interpret current theories of mechanical properties.

The first three chapters deal with stress-strain relationships in static and dynamic tension, compression, shear and torsion. Since the tensile test is the most widely used test for determining mechanical properties of metals and alloys, the author devotes a significant part of the discussion to its characteristics and to the importance of the stress-strain relationship under tensile loading. Applicable for those metals that do not lend themselves to such testing (those metals with low rates of strain hardening, those that fracture under low stress in tension, etc.) is the compression test, discussed in somewhat less detail. The direct shear test and the torsion test in studying mechanical properties are also described in some detail. In chapter 4 the treatment of elasticity concepts is extended to include more complex stress systems.

Slip, twinning and other deformation modes are elaborated upon in a chapter on the plastic properties of single crystals. The form of the stress-strain curve from single-crystal deformation is discussed here also and is one of the best portions of the book. The plastic properties of polycrystalline aggregates is equally well treated in the following chapter.

The book is concluded with a chapter on fracture, with the bulk of the discussion on the characteristics, nucleation and propagation of cracks in brittle, ductile and fatigue fracture.

Each of the chapters is followed by suggested further reading (a list of reviews and books) and several pages of relatively simple numerical problems (no answers supplied). There are approximately 300 detailed references listed alphabetically at the end of the book for those who wish to search further.

The book has no photomicrographs, the author preferring the use of sketches. Graphical representations of experimental results assist the reader in his understanding of the textual material. The mathematics is rather elementary and should be handled easily by undergraduate students. However, a knowledge of basic crystal structures and crystallographic nomenclature is assumed.

The author avoids many of the controversial questions relating to the phenomena of plastic deformation, although he does let the reader know such questions exist. In spite of the fact that much emphasis has been placed on applying dislocation theory to the interpretation of plastic deformation phenomena, he shuns the details of many of these theories.

It was the author's intent that his book should complement another volume to the Macmillan Series, namely *Elementary Dislocation Theory* by Weertman and Weertman. Some may not favor the division of the subject matter, but there is no question that when accompanied by the Weertmans' book the value of Tegart's work is greatly enhanced. In any event, the book is good reading for undergraduate students and for practicing metallurgists who desire to reacquaint themselves with the mechanical properties of metals and alloys.

* * *

The reviewer is on the staff of the metal-physics section of the National Bureau of Standards, Washington, D. C.