

tics is quoted here on pages 596-97.

Chapter 14 deals with Einstein's fluctuating views on Zionism culminating in an interesting account of his refusal to become President of Israel in 1952.

A relatively small fraction of the book deals explicitly with Einstein's work in physics. These sections consist of historical discussions and a summary of the theories. These summaries are very good and deal with thermodynamics, statistical mechanics, photons and quantum theory including a poor discussion of the Einstein-Podolsky-Rosen paradox. Two chapters deal with relativity (4 and 8), ending with a description of unified field theories.

In these parts of the book we encounter the other important figures in physics. Niels Bohr, Max Born, Luis de Broglie, P.A.M. Dirac, Paul Ehrenfest, Werner Heisenberg, Konrad Lorentz, Ernest Schrödinger and many others appear on the pages, often with copious quotations. Their roles and personalities is fairly assessed on the whole, although Dirac deserves much more than a passing mention of his name in connection with the probabilistic interpretation of quantum mechanics! Max von Laue's attitude in the Nazi days is misinterpreted and so is W. Lenz's priority discussion on special relativity, which is also factually incorrect.

The illustrations in the book are delightful, including a photo of a blackboard used by Einstein, with Descartes' name misspelled. The early family pictures and the genealogical table (going back to 1737!) are of great added interest.

The referencing and the index is an irritating feature. In the text quotations occur for which not only the source but often the name of the person quoted is only given in the notes at the end of the book. Since the value of the remark is a function of the source, this results in constant shuffling of pages. The notes and the index are incomplete in the sense that some names mentioned in the text are not listed in the index, and some quotations have no source.

I consider this book an important contribution. It, however, requires a careful and repeated reading in order to compose a coherent picture of Einstein and his life from a wealth of detail. Perhaps the author would consider to publish a shorter version, the same as was done for Churchill's great work on Marlborough.

* * *

Nandor L. Balazs became interested in the history of physics, in particular that of relativity while working with Schrödinger and Einstein. He wrote articles on Einstein and on relativity in the Encyclopaedia Britannica and in the Dictionary of Scientific Bibliography. He is presently at the Department of Astrophysics, University Observatory, Oxford.

The Theory of Optical Activity

D. J. Caldwell, H. Eyring

244 pp. Interscience,
New York, 1971. \$14.95

It is well known that optical activity is a powerful means of studying the configuration and conformation of organic and inorganic molecules. Optical rotatory dispersion and circular dichroism in absorption regions especially have been very useful, supplementing ultraviolet and infrared spectroscopy. This book is the first single source for all the necessary background material in the development of optical activity theory.

Starting from basic electromagnetic and quantum theory, the authors present the fundamentals of optical activity theory, both classical and semi-quantal—in the same sense that the radiation field is not quantized. (Quantum field-theoretic formulations are given in H. F. Hammett, *Advanced Quantum Chemistry*, Addison-Wesley, Reading, Mass., 1965, chapter 12, and P. W. Atkins and L. D. Barron, *Proc. Roy. Soc. A304*; 303, 1968). Then some specific applications of the theory are given, and special topics are discussed, including vibronic theory, exciton effects, the Faraday and Kerr effects.

This book is well written in general and has relatively few errors. The very complete development of all the fundamentals of semi-quantal optical activity theory presented in this book is not found in other sources. For the details of rotational strengths, the authors emphasize the approximate summation method (which may be called a generalized Unsöld approximation). This method appears to be useful when interpreting experimental data with relatively few parameters, as demonstrated by some examples in chapter 5. (However, some care must be taken for the use of the results developed in chapter 4. Since the authors use the unnormalized incomplete perturbed wavefunctions, the general terms of rotational strengths, higher than the first order in the perturbation V , should be modified. Practically this does not appear to give any problems, since one is usually interested in the lowest-order nonvanishing terms.) Although the approximate summation method provides useful semiempirical relations, the authors seem to overemphasize the method—other models and semiempirical calculations (for example, those of A. J. Moscowitz and co-workers) are not fairly represented. The systematic perturbation-variation approach to the calculation of rotational strength and the optical rotatory parameter (also the Faraday, Kerr, and Cotton-Mouton effects) is also available, but it is not discussed in the book.

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In Chapter 6, the authors present a careful discussion on the Faraday effect for the diamagnetic case. The approximate summation of perturbation terms is again emphasized. However, some important features (for example, interpretation in terms of A, B and C terms) reported in the literature are missing. (See A. D. Buckingham and P. J. Stephens, *Ann. Rev. Phys. Chem.* 17, 399, 1966). Finally, the authors do not give detailed references that may have been useful for advanced workers in this field.

Nevertheless, this book presents a complete detailed description of all the fundamentals of optical activity theory and a very careful analysis of the main features of rotational strength and correlations between the theory and experimental results. I believe that this book will be very useful for graduate students and researchers who are interested in optical activity theory.

TAI YUP CHANG
Ford Motor Company
Dearborn, Michigan

Rotational Structure in the Spectra of Diatomic Molecules.

Istvan Kovacs

American Elsevier,
New York, \$16.75.

Since the early 1920's, before the discovery of quantum mechanics, the analysis of the rotational structure of diatomic molecules has been an active field of investigation. Istvan Kovacs has played a significant role in the area for the past 25 years. This monograph is a summing up of the great mass of work in this speciality.

The inevitable question is: "What does this book contain that is not in Geshard Herzberg's book, *Spectra of Diatomic Molecules*," published in 1950?" Although the fundamental theory of molecular fine structure was worked out in the 1920's and 1930's, a great deal of elaboration, systemization and collation of results has taken place since 1950. In fact, about half the references in Kovacs's book are to papers published since 1950.

The intention of this book is to "be useful to both theoretical and experimental research workers who want complete and unified information concerning the rotational structure in spectra."

It opens with a section on the foundations of the theory of diatomic molecules, which applies angular momentum and perturbation theory in considerable depth to the subject of diatomic molecules. A strong knowledge of quantum mechanics is presupposed on the part of the reader. A section on

multiplet term formulas considers fine structure due to spin or rotational uncoupling of orbital angular momentum in Hund's cases *a*, *b* and *d* and in intermediate cases in exhaustive detail. Similarly, the intensity of transitions between multiplets is considered in a wide variety of cases. Finally an account is given of the theory of perturbations of molecular fine structure levels.

In a field as mature as the theory of diatomic molecules, it is difficult to write a truly comprehensive treatise. Each monograph must, of necessity, stress certain topics to the exclusion of others. Kovacs's treatise is based on a tradition of optical spectroscopy that goes back many years. The emphasis is on the theory of fine-structure levels and the effect of these structures on optical spectra.

The author's emphasis on optical spectra is chosen at the exclusion of topics of interest to microwave and radiofrequency spectroscopy. The topics of hyperfine structure, Zeeman and Stark effects, with the concomitant discussion of interaction of nuclear and molecular moments with each other and with external fields, are omitted entirely. Furthermore, the theory of molecular interactions that produces fine structure is usually reduced to a parametrization, which can be used to fit experimental data. The origin of these parameters in angular-momentum theory is treated extensively. The relation of these parameters to molecular structure and molecular wave functions is not given. Thus this work will be of interest largely to workers in the field of diatomic molecules, especially those who are interested in optical spectroscopy.

WILLIAM LICHTEN
Yale University

Quantum Theory of Many Particle Systems

A.L. Fetter, J. D. Walecka

601 pp. McGraw-Hill,
New York, 1971. \$19.95

In the past it has been rather difficult to find textbook material to help second- and third-year graduate students bridge the gap between general graduate courses in quantum mechanics and the extensive literature devoted to the many-body problem. The most widely used existing texts, for example Aleksandr A. Abrikosov, Lev P. Gorkov and I. Ye. Dzyaloshinski's *Quantum Field Theoretical Methods in Statistical Physics* and Leo P. Kadanoff and Gordon Baym's *Quantum Statistical Mechanics* cover some of the possible topics in great detail but leave out some very im-