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.

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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.

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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 extentive literature devoted to the many-body problem. The most widely used existing texts, for example Aleksi 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-