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mus brings in organic and polymer glasses only when their properties, or theories about them, are relevant to some aspect of inorganic glasses. On the topics I am familiar with, I find that he mentions most of the important points and gives the right references. Topics covered are formation and structure including phase separation and crystallization; transport, including viscosity and relaxation, diffusion, and electrical properties; chemical and surface properties, including glass electrodes; and optical properties, specifically absorption.

It is an excellent book for the beginner, for whom it was written.

MARTIN GOLDSTEIN
Yeshiva University
New York, New York

Molecular Reaction Dynamics

R. D. Levine, R. B. Bernstein
250 pp. Oxford U. P., New York, 1974.
\$10.00

The scope of chemical kinetics has recently expanded greatly as tools have been developed to penetrate into the molecular mechanisms of chemical reactions. This book is an attempt to give beginning students a general introduction to these recent theoretical and experimental developments. R. D. Levine and R. B. Bernstein have contributed to the field in important respects, and they should be well qualified to write such a book. On the whole the effort would appear to be successful. There is a careful discussion of the dynamics of collisions and the use of scattering as a probe of collision dynamics. The authors consider in some detail the processes involving polyatomic molecules with considerable use of potential-energy surfaces, and with consideration of the relationship between the shape of the potential-energy surface and the way the energy is distributed in the product molecules—and how both of these are related to the angular distribution of the scattered particles. There are chapters on energy exchange and on chemical dynamics, dealing in large part with polyatomic molecules.

One of the questions that is considered at different points throughout the book is that of a reaction intermediate. It is pointed out that a long-lived intermediate will give rise to scattering, in a beam experiment, which is more or less independent of angle, while a short collision will cause directed scattering. The vibrational behavior of a long-lived complex between two alkali-halide molecules is described as an example, with a diagram showing typical behavior.

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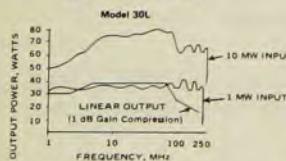
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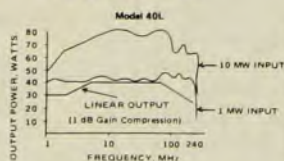
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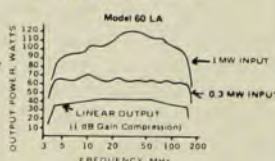
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The recombination of atoms in the presence of a third body is treated only briefly at the end of the book. They do stress the frequent formation of complexes with the third body, but they do not mention the importance of van der Waals forces. They bring out some difficulties in the interpretation of the dissociation of diatomic molecules. I cannot agree with the interpretation (which appears to be made, but perhaps is not intended) that these difficulties follow from the fact that the molecules dissociate from the highly excited vibrational states, and therefore the dissociation is not the direct reverse of the association; when the atoms recombine, they go into these same highly excited vibrational levels.

No attempt is made to be exhaustive, as far as the discussion of particular systems is concerned, but the principles are illustrated by numerous examples. The treatment is not highly mathematical; the attempt, rather, is to bring out the physical principles involved, and to give a broad overview rather than to discuss the complications of particular cases. This seems to be a proper way to introduce the subject to newcomers, though it inevitably means that some of the discussions will be rather sketchy. I found it useful in my own case, as a review of the present status of a subject in which I used to be active, but in which I have not recently done much work. The one criticism that I would make in the presentation is that in several places results were more or less arbitrarily introduced without much explanation, and without connecting them up with the physical situation, rather in contrast with the general tenor of the text. A few pages added here and there, and in some places a little more precision in the definitions of terms used in a special context, would save some readers much time and others a certain feeling of frustration. However, this will not prevent the book from being a very useful introduction to the field as a whole.

Because this book is designed as an introduction—in the words of the authors, “a map of the ground floor”—it is reasonable to ask what background is required. Actually this would seem to be minimal. An understanding of the Boltzmann distribution is about all that is needed in the field of statistical mechanics. As to quantum theory, most of the book should be readable if the student has a general knowledge of energy levels and an idea of the principles of molecular spectroscopy. Only in one section, dealing with semi-classical scattering theory, is the scattering matrix introduced and some use made of the time-dependent Schrödinger equation.

There is a fairly extensive bibliography at the end of each chapter, which can lead the student to some supplementary reading. However, there are

no problems, so that an instructor using this book as a text would have to find or devise his own. The book is amply illustrated with many instructive diagrams, and seems to be relatively free of typographical errors.

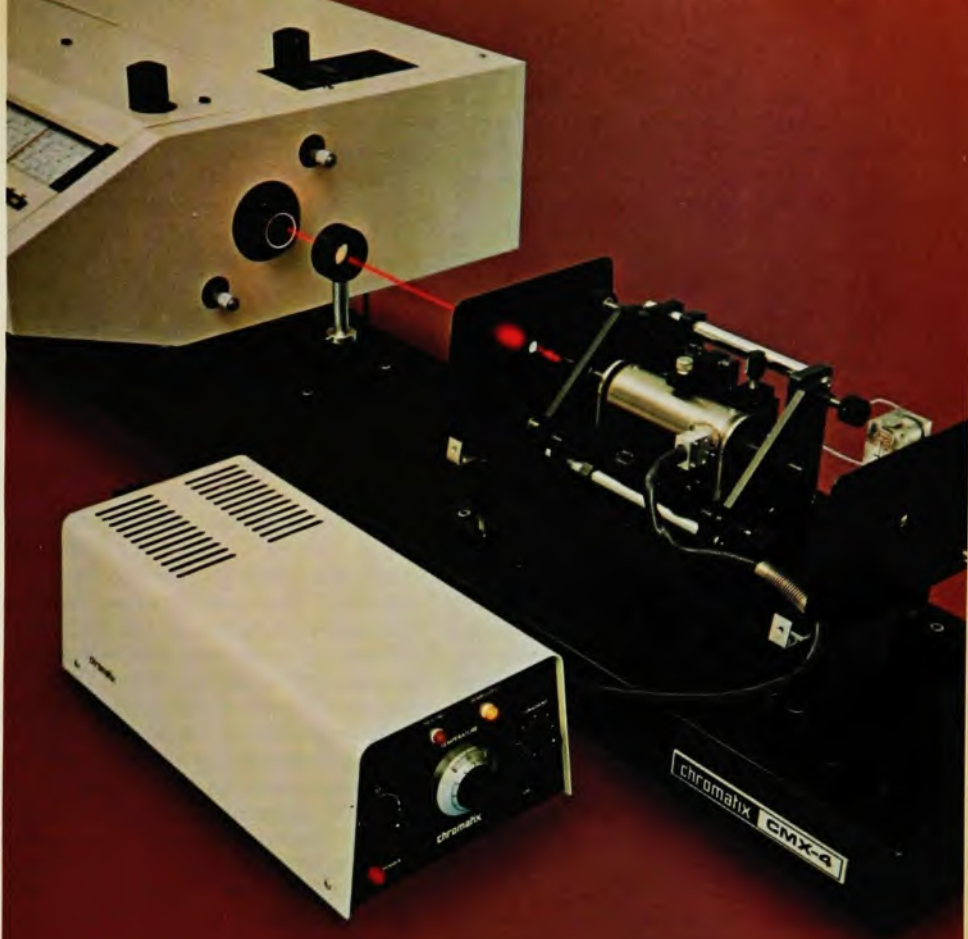
OSCAR K. RICE
University of North Carolina
Chapel Hill

Fields of Force: The Development of a World View from Faraday to Einstein

W. Berkson
370 pp. Halsted, New York, 1974. \$19.75

This book is largely a sustained argument for a "realistic" philosophy of science. According to such a view, scientific hypotheses (laws and theories) are regarded as explaining the world; they do not merely classify data. More specifically, the author, William Berkson, argues that the best world picture is the most classic theory of fields—Michael Faraday's. Berkson was a doctoral student of Karl Popper and he notes that his teacher's "philosophy of science permeates the work." Popper views the scientist as always attempting to falsify hypotheses deductively; he can never legitimately verify them inductively. How, then, is Popper's philosophy to be reconciled with Berkson's realism? That is, how can Berkson emphasize that hypotheses describe the real world when his teacher will not let him assert that hypotheses are true or possibly true?

Berkson's lack of adherence to strict falsificationism makes for difficulties in the prefatory discussion of his overall purpose. Since childhood, he has wanted to "understand the mysterious world." He finds that relativity and quantum mechanics attempt to give a general world view, but when taken together, they are incoherent. Having these two apparently exhaustive hypotheses sets up a situation in which a "crucial test" can be performed. According to strictly falsificationist (deductive) logic, one need only falsify one hypothesis to confirm the other. Berkson gestures in this direction, adumbrating two problems for quantum theory. However, neither his preference for unified world pictures nor that of Einstein and others is likely to convince the contemporary physicist. Likewise, his dismissing without explanation previously attempted reconciliations of the two theories in the form of quantum field theory will cut little ice. Berkson deviates from the received logic in devoting his book to confirming



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