encourage and organize the amateurs.

It is hard to find any nits to pick in this book. The kidney-produced protein mentioned in the caption of the next to the last illustration is renin, not resin. The *AIBS Bulletin*, which attempts to cover all the biological sciences, should not be listed under "Herpetology, Ecology, etc." (p. 92). The headquarters of the Entomological Society of America were moved in 1960 from 1530 P St., NW, Washington, D.C., to 4603 Calvert Road, College Park, Md. (p. 95).

This book is not a compilation of science fair projects, but it should be read by every student who wants to devise a worthy exhibit. It will give him incentive and encouragement, and it may win him for science after the fairs are over. From it, older laymen can learn why the pursuit of science is absorbing.

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Molecular Models

Chemistry in Three Dimensions. Louis F. Fieser. Published by the author, 1963 (order from Macalaster Scientific Corp., Cambridge, Mass.). vi + 122 pp. Illus. Paper, $1.50.

Louis Fieser has developed an inexpensive plastic copy of André Dreiding's popular, stainless steel, molecular models. A good idea of the models and of this book is given in an article by Fieser, published in the *Journal of Chemical Education* [**40**, 457 (1963)], in which he states that the book is intended "to promote use of the models in high schools. . . . It presupposes no previous knowledge of chemistry and develops principles of the structure and stereochemistry of organic compounds largely by prompting the student to discover these principles by study of models of his own construction." Although Fieser hopes that "for some readers it may be self-teaching," the abbreviated style will probably make supplementation by a teacher desirable.

This lively volume is primarily addressed to students rather than to the author's colleagues. Purists may object to the chatty, informal style, which involves the use of the first and second persons, direct questions, and the currently condemned [*J. Chem. Educ.* **40**, 561 (1963)] anthropomorphism and teleology of atoms, but the author, who is obviously having fun, should communicate a spirit of excitement to the student. One section leads almost effortlessly to another; by the time the student has digested the 113 pages of text, which consists largely of excellent photographs and drawings of models, structural formulas, and apparatus, he has acquired a broad, if somewhat shallow knowledge of an amazing variety of fundamental topics in organic chemistry—isomerism (optical, geometric, and structural), valence, atomic and molecular weights, homologous series, nomenclature, natural products, polymers, conformation, resonance, and clathrate complexes, to mention only a few.

This is an active book, filled with directions, problems, and experiments, not armchair reading. Representative experiments include the solvent extraction of lycopene from tomato paste and its purification by adsorption chromatography and the isolation of oleic acid from olive oil by preparation of the urea inclusion complex. Smatterings of history and odd facts such as word derivations, occasionally so irrelevant that they almost smack of free association, serve to enliven the text and to exhibit the author's encyclopedic knowledge.

Although it was designed for use with the author's models, the book can be adapted for use with other models. If used without models, it would undoubtedly lose much of its effectiveness, especially in the fairly detailed sections on cycloalkanes and polycyclic systems.

Even though the subject matter is confined to organic chemistry, a fact not indicated by the title, Fieser should have made it clear to students that the carbon atom has no monopoly on stereochemistry. An introduction might have referred to configurations for coordination numbers other than four. In a broader treatment, the student could have used models to convince himself by isomer counting that the configuration of the carbon atom is not square planar but tetrahedral. Asking the student to accept this, the cornerstone upon which both the models and the book are built, merely as an act of faith seems contrary to the do-it-yourself spirit of the book.

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Perturbation Theory

Methods of Quantum Field Theory in Statistical Physics. A. A. Abrikosov, L. P. Gorkov, and I. E. Dzyaloshinski. Translated from the Russian and edited by Richard A. Silverman. Prentice-Hall, Englewood Cliffs, N.J., 1963. xvi + 352 pp. Illus. $16.

This book deals with the use of some methods of quantum field theory in statistical mechanics. The methods under question are essentially the perturbation theory techniques of many particle systems. There are various forms of the perturbation theory in such a context. Fortunately, the book is not just about the methods, as the title may indicate, but about their actual applications to some of the most important problems in statistical physics and many body systems. Throughout the volume, the authors use one particular method, the most convenient one for the purpose at hand, namely the method of Green's functions.

The first chapter begins with an excellent discussion of the general properties of many particle systems at low temperatures based, phenomenologically, on the frequency spectrum of lattice vibrations (phonons) as a function of the wave number. It also includes a simple form of the perturbation theory applicable to weak interactions where a few terms of the perturbation series would give satisfactory results, such as the problems of dilute Bose and Fermi gases. A more sophisticated form of perturbation theory is necessary in cases of stronger interactions where one has to sum up whole sequences of terms. These techniques which use the so-called Feynman diagrams have been very successful in quantum electrodynamics and are discussed (in chapters 2 and 3) for the two cases—temperature $T = O$ and $T \neq O$, respectively. Of course, there are some differences in the way the diagrams occur in quantum field theory and in statistical mechanics. In the first case one considers the scattering of particles, and the diagrams give all possible virtual processes that occur in the intermediate states; in the latter case the diagram expansion is used in evaluating the expectation value of an exponential operator, the grand partition function.

In the remaining chapters (more than half of the book) there is a detailed discussion of the application of these methods to the following problems: theory of the Fermi liquid (in-