secondary schools. The lessons are not intended to be directly available to students but rather to be guides to the teacher, and they are accordingly supplemented by explanatory remarks and notes which serve admirably to motivate the choice of material and to establish the proper mathematical and pedagogical perspective. The authors disclaim any intention to produce a comprehensive syllabus and explicitly warn the reader against supposing that the omission of a topic indicates that they recommend its expulsion from the curriculum. (The point is taken, since there is no treatment in the book of the elementary differential calculus; it is intriguing to wonder why no member of this excellent group felt an irresistible urge to rethink out loud the vexatious problem of how to teach this fundamental topic in mathematics.)

The book consists of an introduction, 11 chapters, and an extensive bibliography. The chapters are "Binary systems"; "Finite arithmetics and groups"; "Numerical methods and flow charts"; "Sets, logic, and Boolean algebra"; "Relations and graphs"; "Linear programming"; "Patterns and connections"; "Convexity"; "Geometry"; "Vectors"; and "Matrices." Throughout the book the authors consistently emphasize both the mathematical content of the ideas being presented and their applicability to situations within the grasp and experience of the student; each of these facets of mathematical instruction enriches the other, and I was delighted to observe this splendid vindication of the viewpoint that mathematics is one and indivisible (contrary to the view that there are many different subjects, called respectively mathematics, mathematics-for-the-layman, mathematics-for-the-engineer, mathematics-for-the-physicist, and so on).

A few comments of a more critical nature should strengthen the effect of my general approval. For example, there seems to be insufficient emphasis on clear-cut definition. It is common ground that some familiarity and appetite must be generated before definitions are given and terminology established; but strict definition is an essential part of the mathematical process, and this is often not supplied (could the reader ever say just what a vector space is?). I am also out of sympathy with the tenor of the authors' remarks on the psychology of teaching. Had they confined themselves to observing that mathematics teaching (indeed, all teaching) must make the subject matter attractive, there could have been no cavil; but it is strongly implied that in planning our curriculum we must take into account the information available to us from modern psychology. I am strongly of the opinion that this information is of an observational and not of a predictive nature; and that it would be folly to halt the exciting experiment in mathematical pedagogy, to which the authors have significantly contributed with this book, on the basis of evidence obtained exclusively from situations in which none of the participants had been exposed to such experiment.

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A Concise Review

An Introduction to Physical Biochemistry. Henry B. Bull. Davis, Philadelphia, 1964. xii + 433 pp. Illus. $8.50.

The intent of the author, a practising physical biochemist, was to show the capabilities of physical chemistry in interpreting phenomena and structures encountered in biochemistry. Avowedly, *An Introduction to Physical Biochemistry* is designed for students in biological sciences, who are not expert in either biochemistry or physical chemistry. On the basis of the material in the book, and particularly on the manner in which the material is presented, the author must have assumed that the prospective students would have mastered at least the fundamentals of mathematics, physics, physical chemistry, and biochemistry. All of these subjects are touched on in the course of the presentation of various topics.

In the first chapter (28 pages), in order to recall what students might have learned about mathematics, the author most briefly runs through numbers and exponents, solution of equations, differential calculus, integration, expansion series, trigonometric functions, probability and error, method of least squares, and dimensional analysis, and even comments on computers.

Equally concise are the chapters "Energetics in biology," "Electrolytes and water," "Oxidation-reduction potentials," "Acids and buffers," "Biopolymers," "Osmotic pressure and related topics," "Solution optics," "Surfaces and interfaces," "Viscosity and the flow of liquids," "Diffusion," "Ion transport," "Electrophoresis and electrokinetic potentials," "Sedimentation," "Kinetics and enzyme activation," and "Elasticity and structure." For the interested student, there are general references at the end of each chapter so that a given subject can be pursued in greater detail. A stimulus to do so would be supplied by an attempt to solve the problems given to test one's understanding of the points touched on in a chapter. The answers to these problems are given. A rather well organized index adds to the usefulness of the book.

The application of the methods of physical chemistry to the problems of biochemistry are frequently indicated by examples taken from the literature. Furthermore, there are comments on the applicability or limitations of the methods thus used.

All in all, this is a refreshingly *concise review* or *outline* of the relationship between physical chemistry and biochemistry. It is *not*, strictly speaking, an *introduction* to physical biochemistry. A beginning student would certainly be frustrated by the dearth of detail on any of the topics covered.

There are many, many typographical errors in this book, and some of them are rather amusing.

Those who want a concise review of some topics in physical biochemistry may find that this book serves them well. It is readable and at times stimulating. But those who desire a detailed presentation should look elsewhere.

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Organic Chemistry

The Systematic Identification of Organic Compounds. A laboratory manual. Ralph L. Shriner, Reynold C. Fuson, and David Y. Curtin. Wiley, New York, ed. 5, 1964. x + 458 pp. Illus. $7.75.

The fifth edition of this well-known text differs from its predecessors in that more space is devoted to instrumental methods of analysis. A section on proton magnetic resonance has been added, and the section on the use of optical methods has been sub-

stantially increased. However, the original objectives—to teach fundamental organic chemistry and to give the student an opportunity to unify his knowledge of the field—have been retained. The "Tables of derivatives" have been expanded from 2000 to 2700 entries. The only change in the sets of problems are minor deletions in sets 1, 6, and 10. A few new problems, whose answers would not be available in the fraternity files kept on many campuses, would have been welcomed by those who have used previous editions of the text.

The authors are aware of the fact that the advent of many instrumental methods of analysis means that it is possible to identify several substances without recourse to the more laborious and slower chemical reactions. They contend, however, that a student who plans to do basic research on organic compounds must have a thorough understanding of the chemistry of functional groups no matter what the nature of his research may be. Although many teachers of organic chemistry prefer to include qualitative organic analysis with the introductory laboratory work, it seems that a worthwhile case can still be made for teaching a separate course in this area. In an age when descriptive chemistry is fast fading from the curriculum, this method of approach to the subject matter is an excellent teaching device, and the authors of this text are to be commended for their attempts to keep the material up to date. The book is recommended without reservation, especially to the young instructor embarking on a teaching career.

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Hypotheses and Data

Advances in Experimental Social Psychology. vol. 1. Leonard Berkowitz, Ed. Academic Press, New York, 1964. xiv + 319 pp. Illus. $9.

In the editor's preface, Berkowitz suggests the *raison d'être* of this stimulating collection of monographs—". . . it is the integration of facts with which we shall be primarily concerned." At a time when almost every new book in social psychology is a collection of reprints, this creative endeavor, the first in a series, is most welcome. Here is a judiciously selected pot pourri of original monographs that can inform the professional social psychologist as well as the psychologist outside of social psychology, who is genuinely interested in finding out what contemporary social psychological experimentation is all about. For example, although I am well acquainted with the current experimental literature in the area of social motivation, I found the monograph by Walters and Parke, "Social motivation, dependency, and susceptibility to social influence," the most effective statement that Walters has yet made of his notion that the ". . . relationship between such variables as social deprivation, dependency, self esteem, and various measures of social influence . . ." can be explained in terms ". . . of the development of habits of orienting and attending to others" and the ". . . behavioral effects of variations in emotional arousal."

The papers by Stanley Schachter, "The interaction of cognitive and physiological determinants of emotional state," and William J. McGuire, "Inducing resistance to persuasion," can be especially recommended to those "hard headed" experimentalists who are perpetually dubious about the possibility of doing good manipulative experiments in areas like emotion and attitude change. McGuire's monograph is particularly useful to the novice, since it is McGuire's first integrative theoretical statement pertaining to a series of complex, interlocking experiments that are designed to explore the power of the "inoculation model" in building defenses against persuasive attempts. When viewed in overall perspective, the logic of McGuire's research strategy stands out in sharp relief and is all the more impressive.

The area of small group research is also well represented by papers contributed by William A. Gamson, "Experimental studies of coalition formation," Marvin E. Shaw, "Communication networks," and Fred E. Fiedler, "A contingency model of leadership effectiveness." Gamson's deftly done critical review of theory and research in coalition formation is particularly outstanding for its clarification of basic concepts. His definition of a coalition as involving " . . . the joint use of resources to determine the outcome of a decision in a mixed motive situation involving more than two units," represents an important step forward in delineating the boundaries of this often loosely defined domain.

Berkowitz points out in the concluding section of his preface that "some problems obviously cannot be investigated adequately under the restricted and usually short-lived conditions of the laboratory." It is in this spirit that the monographs by Harry C. Triandis, "Cultural influences upon cognitive processes," and William A. Mason, "Sociability and social organization in monkeys and apes," are included. Both monographs represent a scholarly and effective integration of the existing evidence in these areas.

In concluding this review, I can do no better than to quote once more from the editor's excellent preface—"By presenting their hypotheses, the writers have contributed to the data collection and theory development that will question their own formulations." I can think of no more important function that a series of monographs could serve.

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Ethics as Technology

Ethics and Science. Henry Margenau. Van Nostrand, Princeton, N.J., 1964. xii + 302 pp. Illus. $7.50.

The hope implicit in Margenau's book is not difficult to grasp; familiar with and impressed by the progress of physical science, Margenau wishes to find parallel possibilities for ethics so that it too can progress. The physical sciences have their postulates; ethics has its postulates which it calls "imperatives." There is a kind of progressive verification in the sciences when things turn out to be the way the postulates predicted; comparably, ethical imperatives can be "validated," and validated empirically, since each of them is but a rule that tells us what to do to reach certain "primary values." We either can or can not reach those primary values by following the prescription of the imperative. The reader is cautioned that such a process of testing is difficult, that already we have much human experience to throw into the pot, and that such testing is far more difficult in this area than in, for example, astronomy. What about the "primary values"—