often more convincing than a mere carbon-hydrogen determination. There are several hundred references to original literature, but a preponderance of the papers cited seem to be at least 20 to 30 years old.

It seems incomprehensible that in this book no use is made of ultraviolet and infrared spectra, nuclear magnetic resonance, or gas chromatography. Most chemists consider these indispensable aids. Fifteen or 20 years ago this book might have been preeminent in its field. Although it still has some excellent features, the book is seriously deficient because it ignores most of the newer tools that are so useful in the analysis of organic compounds.

J. S. FRITZ
Department of Chemistry,
Iowa State University, Ames

Mathematics: Problems for Fun

Challenging Mathematical Problems with Elementary Solutions. vol. 1, *Combinatorial Analysis and Probability Theory*. A. M. Yaglom and I. M. Yaglom. Translated from the Russian edition (1954) by James McCawley, Jr. Revised and edited by Basil Gordon. Holden-Day, San Francisco, 1964. viii + 231 pp. Illus. $5.95.

The Survey of Recent East European Mathematical Literature, financed by the National Science Foundation, is adding to the growing interest in new approaches to mathematical learning. *Challenging Mathematical Problems with Elementary Solutions*, an open door to Russian pedagogy, was compiled and published in Russia by twin brothers A. M. and I. M. Yaglom. It contains some problems originally discussed in the School Mathematics Circle, designed for secondary school students, and others used in the Moscow Mathematical Olympiads. The latter is a mass problem-solving contest given annually in an effort to find young persons who are mathematically gifted.

Combinatorial analysis and probability theory are combined to produce problems that require answers to the following questions: How many? In how many ways? How often? Many of the problems in this book represent questions in higher mathematics, although no knowledge beyond that presented in a good high school is necessary for their solution. The following statement is made in the preface to the American edition: "This adaptation is designed for mathematics enthusiasts in the upper grades of high school and the early years of college, for mathematics instructors or teachers and for students in teachers' colleges, and for all lovers of the discipline."

Brief explanatory material and statements of problems greet the reader first. Answers and hints are given at the back of the book. Between the two are the "solutions" (diagrams, discussions, and complete calculations for each problem), thus enabling the self-disciplined student to teach himself. The various sections include problems related to the chessboard, the binomial coefficients, representation of integers as sums and products, combinatorial analysis, computing, probabilities, and experiments with infinitely many possible outcomes. Sets, random choice, convexity, and other notions used in the new mathematics for high schools are introduced and used. A system of asterisks is used to "grade" the problems with respect to their difficulty.

Classical examples are given: Fermat's Theorem: If p is a prime number, then $n^p - n$ is divisible by p for any n; and Cayley's problem: How many convex k-gons can be drawn, all of whose vertices are vertices of a given convex n-gon and all of whose sides are diagonals of the n-gon? Then there are modern versions of old favorites like the problem of the four liars: It is known that each of four people (A, B, C, and D) tells the truth in only one case out of three. Suppose that A makes a statement, and then D says that C says that B says that A is telling the truth. What is the probability that A was actually telling the truth? Among those attributed to 20th-century mathematicians is Banach's match box problem: A man buys two boxes of matches and puts them in his pocket. Every time he has to light a match, he selects at random one box or the other. After some time the man takes one of the boxes from his pocket, opens it, and finds that it is empty. What is the probability that there are k ($0 \leq k \leq n$) matches left in the other box, if each box originally contained n matches?

East Europeans, particularly the Poles, have found that students who are good at, and interested in, extracurricular activities of this caliber may very well develop into first-rate research mathematicians. The kernel of the process is the presentation of a problem with a limited amount of information so that an elementary solution is possible but not immediately apparent. Its solution affords the thrill of discovery and the glow of self confidence.

L. E. WHYBURN
School of General Studies,
University of Virginia, Madison

Legislative Components

The Lawmakers: Recruitment and Adaptation to Legislative Life. James David Barber. Yale University Press, New Haven, Conn., 1965. xiv + 314 pp. $7.50.

The literature of political science in the United States abounds in finely honed analytical exercises. *The Lawmakers* is one of these.

The author, James David Barber, assistant professor of political science at Yale University, establishes a typology of legislators. It is based primarily, he tells us in his preface, on "twenty-seven long private interviews, tape-recorded with the subjects' consent, with legislators serving their first session in the Connecticut House of Representatives." From the 27 interviews, the author culled 12. These, in turn, furnished three examples of each of four legislative types—"spectators, advertisers, [and] reluctants and lawmakers."

The Spectator-type, according to Barber, is a small-town, middle-aged individual, often a woman, with limited skills, restricted ambitions, and modest achievements, whose easy good-nature serves to dampen tensions. Often he (or she) belongs to the minority party in localities where political survival is sought by simply filling the ballot. The legislature is "an awfully good diversion," one Spectator-type is quoted as saying.

The Advertiser qua legislator, on the other hand, is portrayed as a young person of some social and economic substance, who by much hurrying seeks to attain power and security. This self-salesman's chief stock in trade is "personality politics."

The Reluctant is akin to Winnie-the-

Pooh's dolorous companion, Eeyore. He is usually much older than most of his colleagues—or at least older than his years—and inclined to small activities in a community where there is slight competition at election time. He speaks of having been "drafted," and vows to quit the legislature after one session. He is the "handcuff volunteer" of military service humor.

It is the Lawmaker, quite predictably, who ranks highest in the author's esteem. He is energetic, confident, debative, often issues-oriented, affirmative and inclined to view politics as "a way of implementing principles, not a violation of them." If he is to be faulted, it is on the grounds that he expects the legislature to "deliberate like Plato's Academy and then take action like Caesar's Army."

The elaborated descriptions and classifications that occupy the four central chapters are most useful because, as the author explains, "there is little dispute any more that we live under a government of *men* as well as *laws*. Yet we have only begun to find out what public office means, in human terms, to those who govern."

A well-made point, but a caveat, please.

The universality of Barber's typology is uncertain. Connecticut, for one thing, belongs to that grouping of states where the economic and educational attainments are most fully developed. Presumably these elements are reflected in the caliber of the state legislators. Moreover, Connecticut has drastically altered its basis of representation in the legislature since the book was written. It would be interesting to return for a comparative survey. Third, the typology would need adaptation in order to accommodate the 535 members of the Congress of the United States.

However, the book is helpful—"a study of politics as a personal experience of the politician," as the author describes it. A description of recruitment of candidates is also informative.

Overall, *The Lawmakers* provides a proper corrective to those who regard a legislature as a Plato's Academy. The book, likewise, provides substance to those who regard a legislature as a Caesar's Army—on either side of the Rubicon.

WES BARTHELMES
Office of Senator Robert F. Kennedy, Washington, D.C.

Hunter Valley, New South Wales, Australia

The Geology of the Hunter Valley. Beryl Nashar. Jacaranda Press, Brisbane, Australia, 1964. viii + 96 pp. Illus. 25s.

This book is described by its author as "a simple text on the geology of the Hunter Valley," which is "meant to excite an interest in a science which is everywhere around us." In many ways the author has succeeded in producing a book that should be extremely useful to students and amateurs in the Hunter Valley area of New South Wales, Australia.

Part 1 is an introduction to geology which explains briefly and in a nontechnical way some of the basic principles and concepts of geology. It is here that most of the book's weaknesses are located. There are no explicit statements of the ideas of uniformitarianism, superposition, or crosscutting relationships of intrusive rock bodies. These are basic principles for the decipherment of earth history and should be clearly explained in any book intended for beginners. The sections on rock types are very incomplete. In the field classification of igneous rocks, the plutonic rocks are omitted, although granite occurs in the Hunter Valley. The statement is made that sedimentary rocks are clastic rocks, a classification that would omit many limestones.

The section on structural geology has virtually no explanation of strike, dip, anticline, and the like, but several clear diagrams are given. Brief explanations of these terms would result in a very good section on structure. The illustrations are generally good. The drawings of the common fossils found in the Hunter Valley are clear and should be usable for identification.

Part 2 is a general account of the geology of the region by areas, with outlines of a series of excursions. This is well done, with detailed descriptions of many geologic features to be seen in each locality. An enormous amount of information is presented, much of it in a manner that illustrates many geologic processes. Geologic maps of each area are given. This is an excellent way to present the geology of a region to nongeologists and to use it to illustrate geologic principles and processes. We could use many books of this type in the United States.

ERNEST L. LUNDELIUS, JR.
Department of Geology, University of Texas, Austin

On the Efficient Pursuit of Objectives

Decision and Value Theory. Peter C. Fishburn. Wiley, New York, 1964. xviii + 451 pp. Illus. $13.75.

Decision and Value Theory is concerned with the efficient pursuit of objectives. From a mathematical point of view the alternative courses of action may be considered as models or functions relating the various final states with the initial state and the set of decisions made.

Given any element x of a class X of initial states, let v be a function such that $v(x,d)$ is the "value" to the decision maker of the effect of the decision d applied to the initial state x. Then the book is concerned with the process of choosing the set d in such a way that $v(x,d)$ is an optimum. Now x may be a gross approximation to the true initial state, components of x may be known only as probability distributions, or worse yet, how to decompose x into significant components may not be known. The effects of the various decisions may be poorly known, and the values of the final states reached as a result of the various decisions may depend upon the whims of the decision maker. The author admits that "a theory of decision can at best catch only a portion of the flavor and reality of the actual decision process." However, he promises to deal "with a concrete theory of decision which . . . will enable some individuals to make better decisions."

In my opinion the author has only succeeded in presenting a somewhat lengthy discussion of various aspects of the problem as it is stated above. Perhaps the book could be called a comparative literature study on decision making.

HARRY D. HUSKEY
Department of Mathematics, University of California, Berkeley